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by James H. Dittmar and John F. Groeneweg

Lewis Research Center

Cleveland, Ohio 44135

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16. Abstract

Two inlet noise suppressors were tested on a fan in an outdoor noise facility, and sound power attenuations were measured for three treated lengths of each suppressor. The noise reduction from the segment of liner closest to the fan, which contained some additional wall treatment was greater than the reduction from either of the other segments. The decibel attenuations of the ringed liner segments were linear with liner length as predicted by theory. The acoustic attenuation of the wall treatment was considerably greater than expected from available theory, which strongly suggests the possibility of using no-ring inlet suppressors when the required noise reduction is moderate. The decibel attenuations were higher than predicted above 2000 Hz, and the two suppressors behaved similarly despite the prediction of different behavior. A broad-band noise increase was observed with the addition of a taped exhaust splitter. This increase is probably the cause of an observed noise floor and indicates that self-generated noise by splitters could limit attainable suppressor noise reductions.

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SUMMARY

Two inlet noise suppressors containing wall treatment plus three treated rings were tested on a fan in an outdoor noise facility. Sound power attenuations were measured for three treated lengths of each suppressor. The noise reduction from the segment of liner closest to the fan, which contained a segment of wall treatment downstream of the splitter rings, was greater than the reduction from either of the other segments. The decibel attenuations of the ringed liner segments were linear with liner length as predicted by theory. The acoustic attenuation of the wall treatment was considerably greater than expected from available theory. This inordinate effectivness of the wall treatment strongly suggests the possibility of using no-ring inlet suppressors when the required noise reduction is moderate.

The decibel attenuations were higher than predicted above 2000 hertz, and the two suppressors behaved similarly despite the prediction of different behavior. The addition of taped inlet rings to the open configuration caused a shift in noise directivity, and the addition of a taped exhaust splitter caused a broad-band noise increase. This noise increase is probably the cause of an observed noise floor which indicated that self-generated noise by splitters could limit attainable suppressor noise reductions.

INTRODUCTION

The length of a turbofan engine inlet influences the engine performance and the engine nacelle installation. When inlet noise suppression is used, the length and associated weight of the sound absorbing material become significant considerations for the nacelle design. To increase the knowledge of inlet suppressor performance with length variation, the full-scale fan tests described in this report were conducted.

Two existing inlet noise suppressors were tested in an outdoor noise facility at Lewis (refs. 1 to 3). The suppressors were designed using the theory described in references 3 and 4. They were of a perforated-plate-over-honeycomb construction and included wall treatment as well as three treated splitter rings. The differences between the two suppressors were in the open area and hole size of their facing sheets. The attenuation characteristics of the suppressors were expected to differ primarily in level.

The suppressors were installed in a 1.4 pressure ratio, 1.83-meter (6-ft) diameter fan stage. Sound power level attenuation increments were measured for three treated lengths of each suppressor by selectively removing metal tape from the lined surfaces. The exhaust duct, including an aft splitter, was acoustically treated for these tests to minimize forward radiation of aft fan noise that could possibly mask the results of the inlet suppressor length variations.

Other tests were run to evaluate the amount of noise transmitted through the casing. In addition, the effects of the hard inlet splitters on fan noise were determined by comparing the noise radiated from the fully taped splitters with that noise radiated from a hard inlet without splitters. Radial acoustic probe data were also taken in the fan inlet duct at an axial location between the inlet rings and the rotor face. The radial variation of the noise level was measured with both the taped inlet and the soft (active) inlet configurations.

APPARATUS AND PROCEDURE

Fan and Test Facility

Figure 1 is a cutaway view of the 1.83-meter (6-ft) diameter fan assembly used in these tests. This single-stage fan (designated QF-3) had a large rotor-stator axial spacing of approximately 3.7 rotor chords and had no inlet guide vanes. An abbreviated description of the design characteristics of this fan is given in table I.

The tests were conducted in the full-scale fan outdoor test facility at Lewis. Figure 2(a) shows the test site, and figure 2(b) a plan view of the facility. The fan was driven by electric motors inside the building through a gear box and through the shaft shown entering the fan nacelle inlet. The area between the fan and the microphones is asphalt surfaced, and the face of the drive motor building is covered with 15.24-centimeter (6-in.) thick polyurethane ether open-cell foam.

Inlet Suppressors

As noted, two inlet noise suppressors were used in the liner length variation tests.

The inlet suppressors consist of a lined outer cowl and three, 2.54-centimeter (1-in.) thick splitter rings with acoustic lining on both sides of the rings (fig. 1). The suppressor dimensions and the materials used in the acoustic liners are shown in figure 3. As indicated in figure 3 the two suppressors (designated suppressor A and suppressor B) differed only with respect to facing sheet open area ratio and hole size. The intent in testing the two suppressors was to observe the different amount of noise the two suppressors would remove. Suppressor B was the same suppressor as reported previously in reference 3.

These liners were designed using the theory of references 3 and 4. When the splitter rings were in place, they represented roughly a 9-percent area blockage in the inlet duct. The distribution of flow areas in the four annuli from cowl to centerline were 43, 31, 19, and 7 percent of the total flow area.

The liners were constructed with a perforated aluminum sheet bonded to an aluminum honeycomb backing. Different honeycomb backing thicknesses were used on opposing walls of a passage to broaden the frequency range of the noise attenuation. Figure 4 is a cross section of a splitter ring with the two backing depths separated by a septum. An assembled inlet noise suppressor showing the nonradial support struts of 0.158-centimeter (1/16-in.) thick aluminum is shown in figure 5 (suppressor B). The fan drive shaft, which enters through the center of the suppressor, is not shown in this figure.

Exhaust Suppressor

A fully active exhaust suppressor was installed during the testing for inlet suppressor length variation to minimize forward-radiated aft fan noise that might otherwise have masked the results of the inlet tests. The exhaust suppressor dimensions and the materials used in the acoustic liners are shown in figure 6.

Instrumentation

Limited internal instrumentation was provided to permit aerodynamic measurements during the liner tests, primarily for the purpose of determining that the fan was on the proper operating point. A description of typical aerodynamic measurements is given in reference 1.

Acoustic data were obtained by 1.27-centimeter (0.5-in.) condenser microphones located in 10° increments from 10° to 160° from the fan centerline as shown in figure 2(b). The microphones are level with the fan centerline, 5.79 meters (19 ft) above the ground on a 30.48-meter (100-ft) radius.

An acoustic probe was also used in the inlet for some of the tests. (Far field acoustic data were not taken with the probe installed.) A 0.635-centimeter (1/4-in.) microphone was inserted in the fan inlet (fig. 7). The probe was extended inward from the outside wall, and data were taken at six radial positions measured from the outside casing as indicated in figure 7. These locations were chosen to be approximately at the center of equal annular area elements.

Tests

The inlet suppressors were tested at three treated lengths by selectively removing metal tape from the lined surfaces. The length increments were chosen so that the shortest treated length in each passage was broken into equal parts (fig. 8). This was done to make the length of liner, with active walls facing each other, equal in each section for a given passage. As can also be seen in this figure, the first segment of the liner passage (closest to the fan) had additional lining material that extended downstream stream on the outer surface of each passage and was not opposed by a treated surface. The total treated area of each inlet was approximately 23.4 square meters (252 ft^2), and the three sections, from the fan face forward, had 46, 27, and 27 percent of the total area.

A taped inlet configuration including taped splitter rings was tested as the base configuration for the suppressor length comparisons, and a hard inlet without splitter rings was tested to determine any effect of the taped splitter rings on the far field noise characteristics. The inlet suppressors were tested first with the tape removed from the first segment of the suppressor nearest the fan, then the first two segments and finally the full suppressor was made active. The exhaust suppressor was also run, along with a taped inlet suppressor, in a completely taped configuration to determine the effects of the hard exhaust splitter ring.

The suppressor length variation tests were run with 15.24-centimeter (6-in.) thick, polyurethane ether open-cell foam blanketing the outside cowl of the fan. The foam minimized the noise radiated through the cowling. Tests were run with and without this foam to evaluate the amount of casing radiation. A brief description of the configurations tested in found in table II.

Three sets of data were taken at each test condition to minimize short term fluctuations in the generated noise. The data taken at 60, 70, 80, and 90 percent of design speed were recorded on magnetic tape and both a one-third octave band analysis (50 to 20 000 Hz) and a constant band width, narrow-band analysis were performed. The one-third octave data were also corrected to standard day conditions (70 percent relative humidity; 15° C (59° F)) using the methods of reference 5.

RESULTS AND DISCUSSION

Acoustic Data

The one-third octave sound pressure level and sound power level values for each tested configuration are given in tables III to XIII along with a description of each run. These data are tabulated for each microphone at a 30.48-meter (100-ft) radius after the data were corrected to standard day conditions.

Inlet Treated Length Variations

As mentioned previously, the two inlet suppressors (A and B) were tested in three configurations: with the segment of lining material closest to the fan active, with the first two segments active, and with all segments active. (See fig. 8.) The inlet sound power levels were measured for these configurations and compared with the base configuration (a completely taped and thus inactive liner). This comparison allows the evaluation of the acoustic effect of the liner sections to be made independent of any effects of the presence of the inlet rings.

Sound Power Level Spectra

The power spectra obtained for the inlet hemisphere are shown in figure 9 for suppressors A and B at the 90 and 60 percent speeds. Four spectra are shown on each plot of figure 9, corresponding to the taped inlet, first segment active, first two segments active, and fully active suppressor configurations. All the plots show that successive inlet treatment increments produced reductions at the blade passage frequency. However, at frequencies less than 1000 hertz, at both 60 and 90 percent speed, reduction occurred with the activation of the first liner segment, but no appreciable reductions occurred when the second and third treatment increments were added. This indicates the possible existence of a noise floor at the lower frequencies.

Figure 10 shows plots of the inlet hemisphere sound power level attenuations for the three treatment lengths of suppressors A and B. Figures 10(a) and (c) are for 90 percent speed, and 10(b) and (d) are for 60 percent speed. These speeds roughly correspond to the speed of the fan in an engine at takeoff (90 percent) and landing conditions (60 percent). The one-third octave sound power integration was performed over the inlet hemisphere only to approximate the performance of each inlet suppressor.

The sound power attenuations for the 90-percent speed configurations (figs. 10(a) and (c)) show the peak attenuation around the 3150-hertz one-third octave band for all length configurations. The amount of attenuation is less on either side of this frequency, and approaches zero at both low and high frequencies. The peak attenuation is in the one-third octave band containing the blade passage frequency of the fan at the 90-percent speed point with all treated length configurations. The slight shift of the blade passage frequency in one-third octave bands is due to the variation of the set fan speed (to maintain constant corrected speed) with the temperature of the day on which a particular configuration was tested. The first segment of liner in these plots gave a larger power level reduction than did either of the other two length increments. These two length increments gave roughly equal power level reduction increments.

The 60-percent speed sound power level attenuations (figs. 10(b) and (d)) show the peak attenuation to be around the 2000-hertz one-third octave band. Again, the amount of attenuation is less on either side of the peak frequency and approaches zero at low and high frequencies. (The additional attenuation thus observed beyond 10 kHz, particularly in fig. 10(b), is probably the result of successive cavity resonance. This has been previously observed and reported in ref. 6.) The peak reduction is at the blade passage frequency of the fan at the 60-percent speed point. The first segment of the liner again yielded a larger acoustic power level reduction that the next two segments. Also, the power increments of the last two lengths were roughly equal.

At all speed points and with both liners, the peak attenuation was at the blade passage tone of the fan. In addition, the first segment of the liner yielded a larger acoustic power level reduction than the next two segments. An examination with respect to liner treated surface area shows that the reductions are roughly a linear function of this treated area.

Narrowband Spectra

To observe the character of the noise reductions and to examine the possibility of a noise floor, many narrow-band spectra were examined. Some examples of these spectra are shown in figure 11. These plots are a composite of the narrow band traces for the different suppressor length variations at the 40° microphone position and at 90 percent speed. The analysis ranges are 0 to 10 kilohertz with a 20-hertz bandwidth for figures 11(a) and (c), and 0 to 1 kilohertz with a 2-hertz bandwidth for figure 11(b). Below 1000 hertz on these plots, the last two segments of the liner section yielded no appreciable reduction in noise levels. It is likely that a noise floor existed in this fre-

quency range, possibly from the noise generated by the flow over the inlet rings and exhaust splitter. Other possibilities are an external noise floor from the fan jet exhaust or background noise in the test area.

Analysis

Attenuation spectra. - To compare the theory with the experimental data, a number of calculations were performed. These attenuation calculations, made using the theory of reference 3, were for the fully active lengths of suppressors A and B at both 60 and 90 percent speed. These calculations were made for an inlet flow duct Mach number of 0.23 for 60 percent speed and 0.35 for 90 per speed; the results are plotted in figure 12. The attenuation data for the two suppressors are also shown in these plots.

Beyond 2000 hertz the measured attenuations were greater than the predicted values. This behavior was also observed in the data obtained with suppressor B on a different fan (see ref. 3). The predicted curves appear to be peaking at a lower frequency than the measured data. But, if the curves were shifted in frequency to line up the peak attenuations, the curve shapes would more closely coincide. In general, however, the predicted attenuations would still be lower than the measured attenuations at frequencies higher than that at which the peak occurred.

As is also shown by figure 12, the experimental behaviors of suppressors A and B are quite similar in the fully active condition. This similarity was also true in the partly taped configurations. The predicted curves are significantly different for these two suppressors, and the equivalent experimental behavior of suppressors A and B was unexpected and remains unexplained in terms of the existing propagation and impedance models.

Variation with length. - As mentioned previously the first segment of liner gave a larger power level reduction than did either of the other two length increments. This is possibly because the first segment of liner contained additional suppressor material, particularly on the outside wall. This additional material is shown in figure 8 where it is observed that 61 centimeters (24 in.) of acoustic treatment exist on the outwide wall between the ringed segment and the fan face.

To assist in the delineation of the noise reductions of the wall treatment and of the ring sections, the inlet hemisphere power level reduction is plotted as a function of the fraction of ring length that is active. The inlet hemisphere sound power level at 90 percent speed is plotted here because it is representative of the inlet liner per-

formance. These plots of sound power level reduction are shown in figure 13. The curves are for the one-third octave bands containing the blade passage tone, broad-band noise at 5000 hertz, and the first overtone of the blade passage tone. The plots indicate that the variation of the noise reduction with treated length inside the rings is almost linear. This linear variation of decibel noise reduction with treated length is expected from the theory.

If the linear variation of the decibel noise reduction with treated length is assumed to hold for the ringed part of the first segment of the liner, the curves can be extrapolated to the point where none of the ring surfaces were active. This should then reveal the effect of the initial 61 centimeters (24 in.) of treatment on the outer wall. This is done in figure 14 for the blade passage frequency of each suppressor. Here, it is seen that the intercept is 7 decibels for suppressor A and $5\frac{1}{2}$ decibels for suppressor B. The intercepts are assumed to be the attenuations provided by the 61-centimeter (24-in.) section of wall treatment.

The comparison of the experimentally measured attenuation with length and the maximum theoretical attenuation with length is now discussed. Using the theory of reference 3, it is possible to produce a theoretical maximum curve of Δ dB/(L/H) against HF/C as shown in figure 15. (In ref. 3 the curve is plotted for Δ dB/(L/D), where D is the duct diameter. As suggested in this reference, the Δ dB/(L/H) curve is plotted by taking 1/2 of the Δ dB/(L/D) value in order to represent the annular case.) Here, Δ dB is the sound power attenuation, L is the length of acoustic treatment, H is the annular duct height, f is the frequency, and C is the speed of sound. To spot the liner attenuations on this curve, it was necessary to establish these parameters for the test data. For both the ringed and wall treatment calculations the frequency was taken as the blade passage frequency at this 90-percent speed point. This was approximately 2800 hertz, and the speed of sound was 343.2 meters per second (1126 ft/sec). The height of the passage for the rings was taken as the height of the outside passage (20.1 cm (7.9 in.)). The height of the passage for the wall treatment is complicated by the presence of a changing-diameter centerbody. For this analysis the height of the passage was taken as the average of the maximum and minimum heights. (The use of either the maximum or minimum heights does not qualitatively effect the conclusion in this case.) The average height is multiplied by two because the centerbody is not acoustically treated, giving a calculational height of 1.202 meters (47.35 in.). This gives $Hf/C \cong 1.64$ for the ringed section and 9.94 for the wall treatment. The length of the liner rings is taken again from the outermost passage. This gives L/H = 4.3 for the rings and L/H = 0.51 for the wall treatment. The noise reduction for the wall treatment is assumed to be the intercept of the curves (fig. 14) giving Δ dB/(H/H) = 13.8 for the wall treatment in suppressor A, and Δ dB/(L/H) = 13.8 for the wall treatment in

in suppressor B. With Δ dB = 8 7 and 10. 5 for the ring section of suppressors A and B, respectively, this gives Δ dB/(L/H) = 2. 01 for suppressor A and 2. 44 for suppressor B.

When these points are plotted on the theoretical maximum curve they appear as in figure 15. The points for the ringed parts of the suppressors fall below the theoretical maximum. It should be recalled that the opposing walls of a passage in this liner are tuned at two significantly different frequencies. The theoretical maximum curves are calculated for both walls having the same tuned frequency and the optimum impedance at that frequency. This difference should be considered when comparing the experimental points for the ringed portions with the theoretical maximum. The experimental points may then be low for two reasons: (1) The two walls are not both tuned to the frequency where the maximum attenuation was observed. (2) The impedance of each wall at the frequency where it was tuned, may not have been optimum. The attenuations for the outside wall treatment are much greater than the existing theory indicates to be possible. (Even if the wall treatment were analyzed as a circular duct, it would only move the theoretical curve by a factor of 2, and the attenuation would still be considerably above the theoretical maximum attenuation curve.) This inordinate effectiveness of the cylindrical cowl treatment has been observed in other experiments (ref. 7) and is not explainable on the basis of plane wave duct propagation theory. This additional wall treatment attenuation beyond that predicted indicates a need to modify the duct propagation theories to correctly handle this case. Moreover, in a practical sense, it points to the possibility of using no-ring inlet configurations in cases where the noise reduction requirements are not extremely great.

The additional attenuation apparently provided by the outside wall treatment is a possible explanation of the difference between the measured and expected liner attenuations. The theoretical liner attenuation spectra, which have the outside wall treatment giving little effect, are in general lower than the measured attenuation (see fig. 12). The difference between the two attenuation spectra is at least partially explained by the inordinate amount of attenuation provided by the outside wall treatment.

Effects of Taped Rings and Splitters

Inlet rings. - Tests were run with inlet walls and rings taped and with a hard inlet having no rings to determine the effect of inlet splitter rings on the noise field of the fan. Figure 16(a) is a plot of the blade passage frequency tone as a function of angle for the two configurations at 90 percent speed. The addition of the taped inlet rings alters the fan directivity; blade passage tone levels are lower in the forward quadrant from 40° to about 90° and higher in the rear quadrant at angles greater than 100°. Also, the

inlet pattern is beamed more toward the fan axis when rings are present, where the blade passage tone levels are increased at angles less than 20° (fig. 16(a)). These same trends were observed at the other speeds. (For later comparisons where 90 percent is not available because of equipment failure, the 80-percent point is shown in fig. 16(b).)

Similar directivity effects were observed in the broad-band regions of the spectrum for frequencies above 600 hertz. An example of this is shown in figure 16(c), which is a plot of the one-third octave band centered at 800 hertz for the 80-percent speed case. Here again, inlet noise appears to have been directed toward the axis, and an increase in aft radiated noise was also observed.

The increase in aft noise with the addition of the inlet rings is possibly a convective shift due to the increased velocities in the inlet as a result of the area blockage or possibly a reflection effect of the rings. The increase of the front blade passage tone along the axis is probably just a beaming effect of the long straight rings. It is also possible that the inlet rings and struts have altered an existing inlet flow distortion (see ref. 8) and caused the change in directivity.

Exhaust splitter. - Tests were run with the taped inlet rings with a splitter added to the exhaust duct. This exhaust splitter, previously shown in figure 6, was taped. Blade passage tone levels with and without the taped exhaust splitter are compared at 80 percent speed in figure 17(a). (The 80-percent speed data are shown because a mechanical failure on one of the tests did not allow a 90-percent speed point.) As can be seen, the exhaust splitter had little effect on the blade passage tone, and the observed differences are probably representative of the small variations in repeatability of the measurements.

However, an increase in the broad-band noise was observed in a region centered around 800 hertz from about 315 to 2000 hertz. For example, the 80 percent speed, 800-hertz, one-third octave band data are shown in figure 17(b). As seen here, a sizeable noise increase occurred from about 60° to 140° when the taped exhaust splitter was added. An increase in noise with the addition of the exhaust splitter is also observed at 60 percent speed. (See fig. 17(c).) The increase in noise is observed here, but the overall sound pressure level is not as high as the 80-percent speed case. These results indicate a possible generation of noise by the exhaust splitter and its support struts at the higher flow Mach numbers in the exhaust than in the inlet. (The approximate design-point (100 percent) flow Mach numbers before rings or splitters were added are 0.39 in the inlet and 0.61 in the exhaust.)

To illustrate the spectral changes occurring with the addition of inlet and exhaust splitters, the inlet and exhaust sound power spectra are plotted in figure 18. Four spectra are shown on each plot. Three are for untreated cases, which include configurations (1) without splitters, (2) with inlet splitters only, and (3) with inlet splitters and an exhaust splitter. The fourth spectrum is for full inlet and exhaust treatment active.

Consider first the spectral effects of the addition of inlet rings. The blade passage frequency tone was reduced in the inlet hemisphere and increased in the exhaust hemisphere when the taped inlet rings were added (as was shown previously in figs. 16(a) and (b)). The broad-band levels were also increased in the exhaust hemisphere in the frequency range from 630 to 2000 hertz when the taped inlet rings were added, but the inlet hemisphere broad-band levels in this frequency range were not substantially changed with the addition of the inlet rings.

When the taped exhaust splitters were added to the configuration with the taped inlet rings, the blade passage tone level was not changed either in the inlet or the exhaust hemisphere. However, a large increase in the broad-band noise in the 315- to 2000-hertz range was observed both in the inlet hemisphere and the exhaust hemisphere. This increase in noise, as noted earlier, was probably caused by the generation of noise from the high Mach number flow over the taped exhaust splitters and support struts.

Figure 18 shows that sizable noise reductions were obtained with the fully active suppressor A configuration. However, the broad-band noise below 800 hertz has not been reduced in the inlet hemisphere (fig. 18(a)), and, in fact, the noise in the exhaust hemisphere (fig. 18(b)) from about 400 to 800 hertz is higher than that of the completely hard case without rings or splitters. Therefore, making the liner fully active has not removed all of the noise generated by the flow over the splitters. This internally generated noise by the flow over the splitters may be the broad-band noise floor that was observed previously in the suppressor length variation tests. The observation suggests that noise generated by flow over acoustic rings and splitters may present a floor or limit to the amount of noise reduction achievable by acoustic liners.

Radial Probe Data

Data were taken with a 0.635-centimeter (1/4-in.) microphone probe traversed radially at an axial location between the inlet rings and the rotor face as shown in figure 7 (53.5 cm (21.06 in.) upstream of the rotor). Traverse data were taken for two configurations: one with a taped inlet suppressor (cowl and rings) and the other with fully active cowl and rings (suppressor B). Narrow-band spectra for three radial locations are shown in figure 19 for the two configurations at 90 percent speed.

The 3.40-centimeter (1.34-in.) location (fig. 19(a)) is close to the rotor tip radius and exhibits some multiple-pure-tone activity in the taped version. When the liner was made active, the multiple pure tones at frequencies below 6 kilohertz were significantly reduced. This reduction is attributable to the short lined section on the outer casing between the probe and the fan face (fig. 7). There was approximately 38.89 centimeters (15.31 in.) of treated surface between the fan tip and the probe location.

Both broad-band noise and blade passage tone noise and its harmonics were increased at the internal location of the probe when the liner was made active. The increase in broad-band noise occurred at all of the radial positions as can be seen in figure 19. It is suspected that the increase in generated broad-band noise was the result of increased turbulence levels caused by the oscillating flow in the facing sheet orifices of the liner. This increased turbulence can cause broad-band noise when it interacts with the rotor blades. It is possible that the increased turbulence level was also the cause of the tone noise increase.

Figure 20 is a plot of the blade passage tone level for the various probe positions as determined from the narrow-band spectra analysis. The active inlet produced large increases in blade passage tone noise, relative to the taped inlet, near both the hub and the tip locations with a smaller increase near the center of the blade.

Noise Leakage from Casing

The liner length variation tests were run with 15.24-centimeter (6-in.) thick polyurethane open-cell foam blanketing the outer surface of the fan cowl. This was done to minimize noise radiation through the cowling to the far field. To judge the effectiveness of this foam, back-to-back tests were run on the same day under the same conditions with and without the foam. The tests were run with the fully treated exhaust and the fully active inlet suppressor A. The full duct treatment configuration was used to reduce as much as possible the noise radiating from the inlet and exhaust ducts so that the presence of any cowl radiated noise might be detected.

An example of the results is given in figures 21 and 22. Figure 21 shows the effect of the foam blanket on the variation of the 2500-hertz one-third octave band sound pressure level, which is indicative of the blade passage tone levels at 90 percent speed. (Actually, the blade passage tone is split between the 2500- and 3150-Hz bands.) Figure 22 compares total sound power level spectra with and without foam cowl treatment.

Some small noise increases were observed in the blade passage tone in the front 50° (fig. 21) and in the sound power level at the higher frequencies (fig. 22) when the foam was removed. However, those increases were in general less than 1 decibel and are within the scatter of the data. Therefore, on a one-third octave basis the foam has a negligible effect on the far field noise.

SUMMARY OF RESULTS

Two inlet noise suppressors, each containing three treated splitter rings, were

tested on a 1.4 pressure ratio full-scale fan. The suppressors were of a perforated sheet over honeycomb backing construction and differed in the open area and hole size of the perforated sheet. Sound power attenuations were measured for three treated lengths of each suppressor by successively removing metal tape from the lined surfaces. It was found that

1. The decibel attenuation resulting from the segment of liner closest to the fan was greater than the increment of decibel attenuation resulting from the activation of either the middle or forward liner segments. This phenomenon is, at least in part, a result of the fact that the first segment of liner contained additional suppressor material as wall treatment on the outside wall. The decibel attenuations of the ringed, lined segments (middle to forward sections) were linear with liner length, as expected from theory. The acoustic attenuation of the outside wall treatment, found by extrapolation, is much greater than expected from theory. This inordinate effectiveness of the cylindrical cowl treatment is not explainable on the basis of current plane wave duct propagation theory and indicates a need to modify these theories to correctly handle this case. Moreover, it points to the possibility using of no-ring inlet configurations in cases where the noise reduction requirements are moderate.

2. The decibel attenuations observed experimentally were higher than theory predicted for those frequencies above 2000 hertz. In all cases the suppressors had their peak attenuation at the blade passage frequency even though the theory predicted peak attenuations at different frequencies. In addition, the two suppressors behaved similarly in spite of different open areas and holes sizes for which the theory predicts different behavior.

3. A noise floor was observed at frequencies below 1000 hertz. Acoustic power was removed by the first segment of suppressor at these low frequencies, but the addition of the other two segments produced negligible further attenuation at these low frequencies.

4. For the tests performed with and without taped inlet splitter rings, the addition of the rings caused a shift in fan noise directivity. Exhaust noise levels were increased, and the inlet noise was directed more toward the fan axis. This effect occurred both for blade passage and broad-band frequencies with the greater effect on the blade passage tone.

5. The addition of a taped exhaust splitter did not affect the blade passage tone significantly, but the broad-band noise was increased in the 315- to 2000-hertz range. This noise generated by flow over the splitter and support struts is possibly the noise floor uncovered during the inlet suppressor length variations. This result indicates that self-generated noise by splitters and their supports could limit the amount of noise reduction obtainable by a suppressor.

6. Radial variations in sound pressure level were measured by an inlet probe at an axial location between the inlet splitters and the fan face. The probing was done with a fully taped and a fully active inlet suppressor. Multiple pure tone content near the cowl wall was reduced when the tape was removed, which also activated a short length of outer wall lining between the fan tip and the probe location. At the same time both blade passage tone and broad-band levels were increased at the probe station perhaps as a result of increased turbulence impinging on the rotor from the active splitter ring surfaces.

7. Far field measurements made with and without the 15.24-centimeter (6-in.) thick polyurethane foam blanketing the outside of the fan cowl with full inlet and exhaust treatment showed no appreciable difference in the one-third octave noise levels observed in the far field.

Lewis Research Center,
National Aeronautics and Space Administration,
Cleveland, Ohio, August 8, 1974,
501-04.

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TABLE I. - QF-3 FAN DESIGN PARAMETERS

Pressure ratio at 100 percent of design speed	1.4
Tip speed at 100 percent of design speed, m/sec (ft/sec)	337 (1107)
Number of blades -	
Rotor	53
Stator	112
Rotor tip solidity	1.34
Rotor diffusion factor -	
Tip	0.381
Midspan	0.446
Hub	0.385
Maximum	0.461

TABLE II. - CONFIGURATIONS TESTED

Configuration	Description			Comments
	Inlet	Exhaust	Cowl	
28	Hard, no rings	Taped, no splitter	No foam	----------
31	Taped, with rings	Taped, no splitter	Foam	----------
32	Taped, with rings	Taped, with splitter	↓	No 90 percent speed (mechanical failure)
33	Taped, with rings	Fully active, with splitter	↓	Base case
34	First inlet section, active including rings	↓	↓	Suppressor B
35	First two inlet sections active, including rings	↓	↓	Suppressor B
36	Fully active inlet, including rings	↓	↓	Suppressor B
38	First inlet section active including rings	↓	↓	Suppressor A
39	First two inlet sections active, including rings	↓	↓	↓
40	Fully active inlet, including rings	↓	↓	↓
41	Fully active inlet, including rings	↓	No foam	↓

TABLE III. - NOISE OF QF-3 CONFIGURATION 28 - HARD INLET WITHOUT RINGS, TAPED EXHAUST, NO SPLITTER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2104 rpm; fundamental blade passage frequency, 1858 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	68.8	65.4	66.8	65.8	67.3	66.9	67.8	68.8	69.1	68.9	69.6	72.9	69.6	73.3	74.4	76.0	70.2	117.6
63	71.3	71.5	66.5	66.5	65.5	66.6	66.1	67.8	67.8	67.6	69.0	71.6	70.6	73.1	75.0	76.2	70.0	117.4
80	71.5	71.0	66.8	67.0	65.5	66.6	65.8	67.5	67.6	69.1	70.6	73.2	73.1	75.8	77.3	79.2	71.7	119.1
100	69.0	69.1	68.3	67.0	66.8	68.0	67.3	69.5	71.0	71.8	72.8	75.0	75.5	77.3	79.0	79.2	73.2	120.6
125	72.3	70.0	70.8	70.5	70.2	70.3	71.7	70.8	72.8	74.2	74.8	76.6	76.2	77.0	78.0	77.2	74.1	121.5
160	73.0	71.5	72.0	70.8	70.8	71.3	72.3	72.5	72.7	73.0	74.2	75.1	74.8	74.8	75.5	75.0	73.3	120.7
200	73.5	74.0	72.5	73.4	73.0	70.9	70.0	70.5	71.5	70.7	71.5	72.8	73.2	74.4	75.0	74.2	72.4	119.8
250	73.5	73.3	71.7	71.7	69.8	69.0	68.8	69.7	70.8	71.3	73.0	74.2	74.7	74.7	75.0	74.0	72.3	119.7
315	76.3	74.8	73.3	72.0	71.1	71.0	71.1	71.1	71.3	71.5	72.3	73.9	73.6	74.5	74.3	72.7	72.6	120.0
400	77.8	75.8	74.1	73.3	72.6	71.4	70.6	70.4	71.3	71.6	72.9	74.5	74.1	74.8	74.1	72.0	73.1	120.5
500	77.3	76.0	74.8	74.6	72.5	71.3	70.6	70.5	71.8	72.0	73.3	73.9	74.0	74.8	73.6	71.2	73.2	120.6
630	77.6	77.3	76.3	75.9	73.6	71.9	71.8	71.1	71.8	72.6	73.9	74.3	75.1	75.9	73.4	70.6	74.0	121.4
800	80.5	79.0	78.5	78.0	75.8	74.2	73.2	73.2	73.5	74.8	75.8	76.2	77.2	78.0	74.3	72.4	76.0	123.4
1000	82.2	81.2	80.8	80.2	77.5	75.5	74.3	74.2	75.3	77.1	78.2	78.7	79.7	80.2	75.8	73.6	78.1	125.5
1250	82.9	82.6	82.4	81.9	79.7	77.1	75.4	75.6	77.2	78.9	80.7	81.5	82.6	82.6	77.6	74.6	80.2	127.6
1600	88.3	90.0	89.1	88.3	85.3	83.1	80.1	80.1	82.0	83.6	85.6	86.2	88.0	86.8	81.1	79.0	85.6	133.0
2000	94.4	97.1	97.1	95.3	92.6	89.9	86.9	86.1	88.4	89.8	91.6	91.9	94.9	92.3	86.4	85.5	92.4	139.8
2500	85.2	87.1	87.7	87.9	84.6	81.6	78.9	80.7	84.2	84.9	86.6	87.3	88.7	88.9	81.9	78.5	86.0	133.4
3150	86.9	88.7	89.2	88.9	86.9	83.4	80.9	82.4	86.2	87.4	88.9	89.8	89.9	89.5	83.4	79.8	87.9	135.3
4000	90.3	92.5	92.7	91.8	90.8	88.2	83.8	83.5	87.0	88.5	90.2	91.5	92.0	92.0	85.2	81.8	90.5	137.9
5000	88.4	87.9	89.4	89.6	87.6	85.6	81.6	80.7	86.2	85.9	88.1	90.5	91.7	90.6	84.9	80.7	88.9	136.3
6300	87.4	87.1	87.6	88.3	87.3	83.4	79.4	78.9	83.3	83.3	86.3	88.9	90.6	88.4	83.4	78.9	87.8	135.2
8000	85.3	87.2	88.0	87.2	87.5	83.0	78.7	78.0	83.0	83.7	86.3	89.0	90.5	88.5	83.3	79.0	88.3	135.7
10000	82.8	84.5	85.3	85.0	85.0	80.5	76.6	75.5	80.5	81.1	83.6	85.8	86.6	85.3	81.0	75.5	86.4	133.8
12500	80.0	81.4	82.9	81.4	81.5	77.4	72.7	71.7	77.2	78.2	80.5	83.1	84.1	81.9	78.7	72.6	84.7	132.1
16000	77.0	77.2	78.0	78.1	76.2	72.7	67.0	65.5	71.7	72.2	74.3	77.1	78.2	77.0	74.0	68.2	81.4	128.8
20000	73.0	73.0	73.3	73.6	70.5	65.8	60.0	59.5	63.7	65.3	68.5	71.2	71.5	71.0	67.5	61.6	78.4	125.8
OVERALL	99.1	100.8	101.0	100.1	98.2	95.3	92.1	91.9	95.2	96.2	98.1	99.4	100.9	99.7	94.5	92.0	98.8	146.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	72.6	84.9	90.0	91.9	91.8	90.6	88.8	89.0	91.8	92.8	94.0	94.1	94.4	90.8	82.6	75.8		

TABLE III. - Continued. NOISE OF QF-3 CONFIGURATION 28 - HARD INLET WITHOUT RINGS, TAPED EXHAUST, NO SPLITTER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2461 rpm; fundamental blade passage frequency, 2173 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	73.1	70.6	71.8	71.8	71.8	72.6	72.4	73.6	73.8	73.8	74.1	77.0	75.3	78.1	79.9	81.7	75.2	122.6
63	68.8	72.0	70.3	70.3	71.2	70.2	71.0	71.2	71.5	71.5	73.3	75.9	75.7	75.2	80.5	82.2	74.8	122.2
80	75.7	73.0	77.3	72.2	72.5	70.8	70.5	71.0	72.2	75.3	75.3	78.1	79.0	81.5	83.5	84.2	77.2	124.6
100	72.0	70.8	71.5	71.1	70.1	70.1	71.5	73.3	75.0	76.0	78.1	79.7	80.8	82.8	84.1	85.2	78.2	125.6
125	73.9	72.9	75.1	73.6	73.3	74.3	75.3	75.9	77.3	77.9	79.1	80.9	81.1	82.6	84.1	83.7	78.9	126.3
160	76.4	76.9	76.5	75.2	74.7	75.5	76.5	76.2	77.4	78.0	78.5	79.6	79.5	80.9	82.2	80.7	78.2	125.6
200	76.4	75.7	74.9	73.9	73.7	74.0	74.7	74.2	74.9	74.7	75.7	77.3	78.7	79.7	80.7	79.6	76.4	123.8
250	77.7	76.9	75.7	75.4	75.5	73.4	73.0	74.0	76.0	76.4	77.9	79.3	80.2	80.7	81.2	79.1	77.4	124.8
315	77.4	76.4	76.5	75.7	75.2	74.9	75.2	75.4	76.5	76.5	77.2	78.5	79.0	79.7	80.0	77.4	77.1	124.5
400	79.2	77.2	77.1	75.9	74.9	74.2	74.1	74.4	75.4	76.1	77.4	78.5	79.2	79.9	79.2	76.8	77.0	124.4
500	80.1	78.9	77.9	77.1	75.8	75.3	74.6	75.3	76.1	76.4	77.3	78.2	78.8	79.3	78.3	75.7	77.2	124.6
630	80.5	79.6	78.8	78.1	76.5	76.0	75.0	75.1	76.3	76.6	77.5	78.2	79.3	80.1	78.0	75.4	77.6	125.0
800	82.3	81.5	80.3	80.5	78.3	77.3	76.6	76.3	77.1	78.1	78.6	79.7	80.6	81.5	78.0	75.7	79.0	126.4
1000	84.6	83.0	82.3	82.0	80.5	78.5	77.5	77.5	79.1	80.0	80.9	81.5	82.4	82.8	79.1	76.5	80.7	128.1
1250	84.5	83.6	83.8	83.5	81.5	80.0	78.5	79.0	80.8	81.6	83.1	83.9	84.8	84.5	79.6	77.2	82.4	129.8
1600	88.4	85.5	85.6	85.9	83.8	81.8	80.1	80.4	83.2	84.2	86.0	86.6	87.7	86.9	81.4	78.9	84.8	132.2
2000	94.1	97.1	97.6	97.3	96.3	95.0	92.1	90.0	90.1	92.0	93.8	93.2	96.0	94.5	88.6	85.3	94.4	141.8
2500	90.5	92.5	93.3	93.1	91.6	90.8	87.5	87.1	89.1	90.0	91.8	91.6	93.8	92.8	86.3	83.2	91.4	138.8
3150	88.2	89.0	89.8	89.5	88.0	85.8	84.2	86.2	89.2	90.2	91.5	92.3	92.5	91.5	84.8	82.1	90.1	137.5
4000	91.5	92.5	94.5	93.5	93.0	91.4	89.2	87.9	91.7	92.2	94.0	94.6	95.5	93.9	86.9	84.3	93.4	140.8
5000	90.8	90.5	92.3	92.8	90.7	89.8	87.0	86.3	90.8	90.5	92.5	95.1	96.0	93.5	88.3	84.4	92.9	140.3
6300	90.1	90.4	91.4	91.8	91.3	88.1	85.8	84.4	88.6	88.8	91.3	93.4	94.9	91.4	86.4	82.2	92.1	139.5
8000	87.9	89.4	91.1	90.4	90.3	87.1	84.1	84.1	87.9	88.6	91.1	93.8	93.9	91.6	86.5	82.1	92.2	139.6
10000	85.8	87.3	88.8	89.1	88.8	85.1	82.6	81.5	85.8	86.5	88.8	90.5	91.1	88.8	84.3	79.3	90.8	138.2
12500	82.8	84.1	86.1	85.8	85.6	82.6	79.7	78.2	83.3	83.6	86.4	89.0	88.8	86.3	82.3	77.1	89.6	137.0
16000	80.1	80.0	82.0	82.8	80.3	78.0	74.0	72.8	77.8	78.0	80.5	82.9	83.3	81.3	78.3	73.0	86.4	133.8
20000	75.9	75.4	76.8	77.5	75.1	71.8	67.1	66.6	70.1	71.6	75.1	77.1	76.9	75.6	71.9	66.0	83.3	130.7
OVERALL	100.4	101.7	102.7	102.5	101.5	99.8	97.2	96.4	99.2	99.9	101.8	103.0	104.1	102.4	97.8	95.5	102.2	149.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	73.2	85.5	91.2	94.1	95.1	95.1	93.7	93.2	96.0	96.4	97.6	97.4	96.8	93.6	85.6	77.8		

TABLE III. - Continued. NOISE OF QF-3 CONFIGURATION 28 - HARD INLET WITHOUT RINGS, TAPED EXHAUST, NO SPLITTER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2814 rpm; fundamental blade passage frequency, 2484 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	83.7	76.5	81.2	81.5	79.4	79.9	79.0	78.7	77.9	78.7	80.0	79.8	78.2	82.7	85.2	86.8	80.7	128.1
63	72.7	75.3	74.0	74.2	74.5	73.8	75.5	75.0	76.0	76.0	77.7	79.3	79.3	83.3	85.7	86.9	79.1	126.5
80	74.9	75.4	74.2	73.4	73.7	73.7	74.5	75.7	77.0	78.0	79.9	80.9	83.0	86.4	88.4	89.7	81.4	128.8
100	80.8	80.7	81.2	78.2	74.7	75.0	77.7	79.3	80.5	81.5	83.3	84.3	85.8	88.2	89.7	90.2	83.6	131.0
125	79.5	77.5	77.8	77.3	77.2	78.3	79.5	81.0	82.8	83.7	84.8	85.4	86.3	88.5	89.3	88.7	84.1	131.5
160	80.0	79.5	80.5	78.7	78.7	80.2	80.8	81.7	82.8	82.8	83.7	84.7	84.3	86.7	87.0	85.9	83.1	130.5
200	79.7	79.4	79.4	78.4	78.5	78.5	79.2	79.7	80.0	80.2	80.7	82.1	83.4	85.2	86.0	84.6	81.4	128.8
250	79.9	80.2	78.7	77.7	78.0	78.2	79.0	79.0	80.2	80.9	82.7	83.8	84.4	86.2	86.5	84.2	82.0	129.4
315	80.0	79.7	78.4	78.9	78.7	79.2	79.5	80.2	81.2	81.4	82.4	83.3	83.9	85.2	85.4	82.8	81.8	129.2
400	81.7	79.7	79.2	78.7	78.2	78.2	78.6	78.9	79.9	80.9	81.9	82.8	83.6	84.7	84.2	81.6	81.3	128.7
500	83.9	81.8	80.6	80.4	79.3	78.9	79.1	79.1	80.4	81.1	81.8	82.7	83.8	84.3	83.4	80.5	81.5	128.9
630	83.7	82.3	81.7	81.5	80.2	79.7	79.5	79.5	80.3	80.7	82.0	82.8	83.3	84.2	82.7	80.1	81.6	129.0
800	84.7	84.0	83.2	83.2	81.7	81.2	80.7	80.2	81.0	82.0	82.8	83.6	84.5	84.7	82.5	79.9	82.6	130.0
1000	87.2	85.9	85.7	85.4	84.3	83.0	81.5	81.4	82.5	83.4	84.2	85.0	85.5	85.4	82.7	80.3	84.1	131.5
1250	87.1	86.6	87.1	87.0	86.8	85.0	83.3	83.1	84.0	84.6	85.8	86.7	86.6	86.1	82.5	80.5	85.6	133.0
1600	86.3	86.3	86.5	87.2	86.7	85.3	83.2	83.2	85.5	86.2	87.8	88.1	89.2	86.8	83.3	80.9	86.5	133.9
2000	89.6	89.6	90.0	90.5	89.8	89.0	86.6	87.0	88.5	89.6	91.0	91.1	92.1	90.1	85.3	82.8	89.8	137.2
2500	96.5	98.6	100.6	102.3	103.5	102.8	99.6	96.6	96.3	96.3	97.8	98.4	100.3	98.3	91.0	89.4	99.9	147.3
3150	89.3	90.5	90.6	90.8	90.3	88.9	88.3	89.6	91.9	92.5	93.4	94.5	95.2	92.8	87.0	84.4	92.3	139.7
4000	89.9	90.9	91.9	91.4	91.2	89.9	89.0	90.5	93.4	94.0	95.2	96.7	97.2	93.0	88.0	85.6	94.0	141.4
5000	92.9	93.0	95.5	97.2	95.2	95.5	93.0	91.4	95.0	95.4	96.5	99.3	99.7	95.7	91.5	88.0	97.0	144.4
6300	89.6	90.1	90.9	91.6	90.9	88.5	88.1	88.8	91.8	92.5	94.5	96.4	97.0	92.5	88.8	84.9	94.1	141.5
8000	89.3	91.5	92.5	92.2	92.3	89.8	88.4	88.9	92.5	92.9	94.9	97.1	96.9	94.5	89.2	85.4	95.4	142.8
10000	86.8	88.6	89.9	90.3	89.9	86.8	85.9	85.9	90.4	90.4	92.3	94.1	94.1	91.4	87.3	82.8	93.7	141.1
12500	83.3	85.7	87.5	86.8	86.5	84.3	82.8	82.8	87.5	88.3	90.5	92.3	92.5	89.2	85.4	80.5	92.8	140.2
16000	80.4	81.0	82.8	83.6	81.5	80.2	77.1	77.5	83.0	82.8	85.1	87.4	87.1	84.7	82.0	76.8	89.8	137.2
20000	75.6	75.9	77.0	78.2	76.0	72.8	70.7	72.4	75.7	76.7	79.7	82.1	81.2	79.0	75.7	70.4	86.7	134.1
OVERALL	101.8	102.7	104.2	105.2	105.5	104.7	102.2	100.9	102.9	103.3	104.7	106.3	107.0	104.6	101.2	99.5	105.4	152.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	75.1	87.3	93.9	98.3	100.9	101.6	100.2	99.1	100.1	100.3	101.1	101.1	100.9	97.0	89.0	81.9		

TABLE III. - Concluded. NOISE OF QF-3 CONFIGURATION 28 - HARD INLET WITHOUT RINGS, TAPED EXHAUST, NO SPLITTER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3155 rpm; fundamental blade passage frequency, 2786 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	85.7	79.7	83.0	79.0	81.0	80.5	81.0	80.5	82.0	82.0	83.0	83.5	83.5	87.0	88.0	91.8	83.8	131.2
63	76.8	78.5	77.5	77.0	77.8	77.6	77.5	78.8	79.0	79.8	80.8	82.7	84.0	87.5	88.3	92.0	82.9	130.3
80	77.9	77.4	75.7	75.9	76.7	76.6	76.4	77.4	78.4	80.4	82.6	85.0	86.9	90.2	91.4	94.1	84.9	132.3
100	86.1	84.9	81.1	81.1	81.2	79.7	79.9	82.1	83.4	84.4	86.1	88.8	90.4	92.4	94.1	94.9	87.7	135.1
125	82.5	81.5	81.6	81.5	80.5	81.5	82.5	83.6	85.8	87.0	87.5	89.1	90.1	92.1	93.5	93.4	87.7	135.1
160	83.4	84.1	83.9	82.7	82.4	83.2	84.1	84.9	86.1	86.9	86.9	88.5	88.4	90.6	90.7	90.3	86.8	134.2
200	84.1	83.0	83.0	82.5	82.1	82.0	82.5	82.5	83.1	83.3	84.3	86.2	87.6	89.8	90.3	88.8	85.3	132.7
250	82.6	82.9	82.4	81.6	81.4	80.9	81.4	81.9	83.6	84.4	86.2	88.2	89.1	90.7	90.2	88.5	85.9	133.3
315	86.2	84.0	82.2	82.3	82.7	83.3	82.5	83.3	85.0	85.3	86.3	87.4	88.7	89.7	88.7	86.9	85.8	133.2
400	84.2	83.2	82.8	82.5	82.5	82.2	81.7	82.3	83.7	84.5	85.8	87.4	88.2	89.3	87.8	85.5	85.3	132.7
500	84.9	84.2	83.2	83.4	84.7	83.7	83.1	83.2	84.4	84.9	85.7	87.0	87.6	88.4	87.1	84.4	85.4	132.8
630	86.9	85.4	84.4	85.2	84.7	85.5	83.4	83.2	84.0	84.4	85.7	86.3	87.9	88.0	86.0	83.6	85.5	132.9
800	88.6	87.6	86.6	86.0	85.8	85.3	85.3	84.5	85.3	85.8	86.5	87.7	88.5	88.6	86.0	84.2	86.5	133.9
1000	90.3	90.0	90.2	89.9	90.9	90.0	88.7	86.9	86.7	87.4	87.5	88.9	89.5	89.3	86.1	84.9	88.9	136.3
1250	91.7	93.2	95.0	95.4	96.4	95.5	94.2	91.4	90.5	90.0	90.7	91.1	90.7	90.9	86.5	85.6	93.0	140.4
1600	91.3	92.1	93.6	95.6	95.6	94.8	93.8	90.8	91.3	91.0	92.0	92.4	91.8	90.3	87.5	85.9	92.9	140.3
2000	90.4	90.9	91.9	92.9	92.9	93.6	92.1	90.6	91.4	91.9	93.1	93.2	93.4	90.6	87.1	85.3	92.4	139.8
2500	97.1	98.7	100.4	100.2	100.1	100.7	99.4	97.2	97.4	97.4	98.2	99.7	99.9	95.6	91.9	90.8	99.1	146.5
3150	96.1	97.4	99.1	99.1	99.3	99.6	98.8	96.8	97.5	97.6	98.3	99.9	100.0	96.8	92.5	90.4	98.9	146.3
4000	91.5	92.7	94.9	95.4	95.7	95.5	94.5	94.5	96.2	97.0	98.7	100.3	99.7	95.0	90.7	88.8	97.4	144.8
5000	93.9	93.7	95.2	96.5	95.0	94.5	94.2	93.9	97.2	97.4	99.5	101.2	100.7	96.4	93.2	90.0	98.3	145.7
6300	92.4	92.4	93.1	94.3	94.1	92.4	92.4	93.1	95.3	95.9	98.4	99.6	98.6	95.1	91.9	88.0	97.2	144.6
8000	91.3	92.6	93.6	93.0	93.3	91.5	91.1	93.1	96.0	96.1	98.1	100.0	99.0	96.2	91.5	87.9	97.9	145.3
10000	88.7	89.8	90.3	90.5	90.3	88.3	88.5	90.2	93.0	93.4	95.7	96.4	96.2	93.5	90.0	85.4	96.0	143.4
12500	85.4	87.3	88.0	87.5	87.3	86.1	85.6	86.9	90.3	91.1	93.6	94.6	94.0	90.9	87.9	82.9	95.0	142.4
16000	82.4	82.6	83.5	84.4	82.6	81.8	80.8	82.1	86.1	86.1	88.6	89.7	89.5	86.5	84.3	79.1	92.3	139.7
20000	78.3	78.3	79.3	80.1	77.7	75.8	75.0	77.2	80.5	81.8	84.4	86.1	84.8	82.1	78.8	73.9	90.6	138.0
OVERALL	104.3	105.0	106.3	106.6	106.6	106.4	105.5	104.4	105.9	106.2	107.8	109.2	108.9	106.5	104.3	103.5	107.9	155.3
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	77.2	89.0	95.5	98.9	101.0	102.6	102.5	101.7	102.9	103.0	103.5	103.9	102.5	98.0	91.6	85.1		

TABLE IV. - NOISE OF QF-3 CONFIGURATION 31 - TAPED INLET WITH RINGS, TAPED EXHAUST, NO SPLITTER

[Data adjusted to standard day of 15^{o} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2116 rpm; fundamental blade passage frequency, 1869 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	68.9	68.5	71.0	68.2	70.9	68.9	66.2	66.0	68.0	69.4	70.0	76.5	69.2	73.7	74.9	76.3	71.4	118.8
63	72.0	69.7	71.3	67.5	70.0	68.8	67.7	69.8	67.0	69.7	68.5	76.3	70.2	73.7	74.7	76.1	71.4	118.8
80	73.5	70.2	72.0	68.0	70.7	69.4	67.7	70.5	67.7	71.0	70.7	75.9	73.0	75.9	76.7	77.9	72.5	119.9
100	69.1	69.8	71.8	67.8	71.1	68.3	66.6	69.1	69.8	72.1	73.1	75.5	75.5	77.1	78.3	78.9	73.3	120.7
125	72.3	70.7	73.5	70.8	71.7	70.2	68.2	71.0	72.0	73.2	74.3	75.8	75.5	77.0	78.7	77.6	73.9	121.3
160	73.4	73.4	74.6	71.7	73.7	72.9	70.9	72.6	73.1	74.4	74.7	75.4	75.1	75.7	75.6	75.3	74.0	121.4
200	75.2	76.4	74.7	72.7	73.0	71.2	69.0	71.0	71.7	71.4	71.9	72.7	73.0	74.2	74.9	74.4	72.7	120.1
250	73.7	74.0	74.7	71.3	72.7	68.3	67.5	69.3	69.3	72.0	72.5	74.3	74.2	75.2	75.3	73.9	72.5	119.9
315	75.7	74.5	76.0	72.4	74.4	71.4	69.9	71.5	70.7	72.4	73.0	73.7	74.4	74.5	74.0	72.8	73.1	120.5
400	77.1	75.5	76.1	72.3	75.0	70.5	69.0	70.3	69.6	72.5	73.5	74.1	75.1	75.6	74.3	71.8	73.4	120.8
500	77.3	76.6	77.0	74.0	75.6	71.0	69.8	71.5	71.1	73.0	74.1	74.5	75.6	75.5	74.0	71.2	74.0	121.4
630	78.7	77.2	78.2	75.4	76.5	72.4	70.5	71.5	72.0	74.0	75.2	75.5	76.9	77.4	75.0	70.9	75.1	122.5
800	81.0	80.7	80.3	78.0	78.5	74.0	72.5	73.5	73.8	76.3	78.3	78.3	79.3	80.0	76.3	72.6	77.5	124.9
1000	83.7	82.0	81.9	80.4	80.0	76.0	74.0	75.2	75.4	79.3	80.8	81.1	82.6	82.9	78.3	74.7	79.9	127.3
1250	84.2	84.0	83.3	82.0	81.5	77.5	74.8	76.8	78.2	81.8	83.2	83.5	85.7	85.0	81.0	76.1	82.1	129.5
1600	88.8	89.7	87.7	87.8	84.7	82.2	78.3	80.0	82.2	85.5	86.8	87.5	90.0	88.5	83.3	79.6	86.2	133.6
2000	95.7	98.2	95.2	96.2	91.8	90.0	85.0	86.5	89.3	92.3	93.2	94.7	97.5	94.2	89.2	85.6	93.5	140.9
2500	87.4	89.0	87.9	87.9	85.7	82.7	78.2	81.7	84.5	87.4	88.7	88.5	91.0	89.4	83.4	78.9	87.3	134.7
3150	89.1	89.9	89.1	89.4	86.8	83.6	79.6	83.3	86.4	89.6	90.8	90.6	91.9	90.1	84.6	79.8	89.0	136.4
4000	92.4	93.9	92.9	93.3	89.8	87.4	81.9	83.9	86.8	90.8	92.6	92.8	93.9	92.6	87.6	82.5	91.6	139.0
5000	89.8	90.6	89.5	89.5	88.3	84.1	79.3	81.8	85.3	87.8	89.3	91.1	94.3	90.8	87.5	80.2	89.9	137.3
6300	88.6	89.1	88.9	89.2	87.6	83.2	78.2	79.0	82.6	85.6	88.7	90.4	93.6	88.7	87.1	78.7	89.4	136.8
8000	87.5	88.5	88.9	89.4	87.3	83.2	77.9	78.0	82.9	85.5	88.2	90.4	91.2	88.7	85.0	78.5	89.3	136.7
10000	85.4	86.9	86.9	87.1	86.6	81.2	76.1	74.9	79.2	82.0	84.9	85.6	87.7	84.5	82.2	74.9	87.3	134.7
12500	82.8	82.9	85.0	83.0	85.2	77.4	73.8	71.9	75.3	78.2	80.9	82.7	82.7	80.2	77.7	71.4	85.3	132.7
16000	80.9	78.8	84.3	78.9	85.1	75.0	73.3	68.3	68.8	72.8	75.6	76.3	78.7	75.3	73.7	66.6	84.6	132.0
20000	80.7	76.4	84.6	77.1	85.0	74.4	73.7	66.6	62.8	67.3	70.3	72.2	74.2	70.6	68.7	60.7	86.4	133.8
OVERALL	100.6	102.1	100.8	100.9	98.7	95.2	90.7	92.4	95.2	98.3	99.9	100.9	103.0	100.5	96.5	92.1	100.1	147.5
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	73.8	86.0	89.2	92.6	91.8	90.6	87.2	89.5	92.2	95.0	95.9	95.9	96.7	92.2	84.8	76.0		

TABLE IV. - Continued. NOISE OF QF-3 CONFIGURATION 31 - TAPED INLET WITH RINGS, TAPED EXHAUST, NO SPLITTER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2468 rpm; fundamental blade passage frequency, 2180 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	73.2	71.5	72.3	72.2	73.3	73.7	73.3	73.3	73.0	74.3	75.5	79.5	74.7	77.7	80.7	81.4	75.8	123.2
63	68.7	71.9	70.7	70.2	72.2	70.7	71.4	72.4	70.9	72.1	73.2	78.9	75.1	78.1	81.1	81.3	75.1	122.5
80	74.4	74.2	77.0	71.9	73.2	70.4	72.0	72.9	70.4	74.2	76.4	79.2	77.9	80.7	83.0	83.1	76.9	124.3
100	72.2	71.7	72.0	71.4	73.0	71.0	73.9	75.0	73.4	76.5	78.4	80.5	80.7	82.4	84.4	85.1	78.4	125.8
125	75.4	75.4	75.2	74.4	74.9	76.9	76.6	77.4	76.6	78.1	79.9	80.9	81.1	82.2	84.6	84.0	79.3	126.7
160	76.5	77.3	76.3	75.2	76.5	76.5	77.0	77.7	76.7	78.3	78.8	80.2	79.7	80.7	82.3	81.1	78.5	125.9
200	77.1	76.6	75.9	74.4	76.2	74.9	75.4	75.6	74.2	75.6	76.1	77.4	78.7	79.6	81.2	79.8	76.9	124.3
250	78.0	78.5	76.5	75.3	77.3	73.8	74.3	75.0	74.8	76.3	78.2	79.0	80.2	80.8	81.5	79.6	77.7	125.1
315	77.9	76.9	77.0	76.2	77.5	76.2	75.7	76.0	75.5	76.9	77.7	78.4	79.2	79.7	80.4	78.1	77.5	124.9
400	80.0	78.1	77.5	76.1	77.5	74.6	75.0	74.8	74.5	76.5	78.1	78.3	79.6	79.8	79.5	76.8	77.4	124.8
500	81.0	79.5	78.4	76.9	78.4	75.4	75.5	75.7	75.7	77.2	78.5	78.4	79.7	79.4	78.7	75.7	77.8	125.2
630	81.5	80.4	79.2	78.4	79.2	75.7	76.0	76.2	75.8	77.9	78.9	78.7	80.7	80.4	78.3	75.4	78.4	125.8
800	84.1	82.9	81.5	80.4	80.9	77.4	77.4	77.0	76.9	79.7	81.1	81.4	82.9	82.9	79.4	76.3	80.4	127.8
1000	86.7	84.5	82.9	82.5	82.4	78.7	78.5	79.0	78.6	81.6	83.4	83.8	85.4	84.7	80.2	77.6	82.4	129.8
1250	86.5	86.0	84.2	83.5	83.2	80.2	79.8	80.3	81.3	84.2	86.0	86.0	87.8	86.5	81.2	78.1	84.3	131.7
1600	88.4	88.4	86.4	86.5	85.1	82.1	81.1	82.6	83.7	86.7	88.4	88.6	90.7	88.6	83.1	80.3	86.7	134.1
2000	96.7	99.5	96.4	98.0	94.5	93.4	89.9	91.0	91.2	95.5	96.9	96.2	98.9	95.4	89.9	87.6	95.6	143.0
2500	93.7	95.9	93.0	94.4	91.4	89.9	86.7	89.0	89.5	93.0	94.0	93.7	96.2	93.7	87.5	84.8	92.9	140.3
3150	91.5	92.2	90.3	90.7	89.2	86.2	85.0	87.8	89.7	93.0	93.3	94.0	95.0	92.3	86.3	82.6	91.8	139.2
4000	94.9	95.7	94.4	95.2	92.9	91.1	87.9	88.9	91.7	94.9	95.4	96.2	97.6	94.9	89.1	85.2	94.7	142.1
5000	93.5	94.1	92.8	93.5	91.8	89.0	86.3	88.1	90.5	92.6	93.5	95.8	98.7	94.6	90.2	84.4	94.2	141.6
6300	92.3	92.5	91.5	93.0	91.5	88.2	85.7	85.1	88.0	90.7	93.2	94.5	97.5	91.9	88.9	82.3	93.4	140.8
8000	90.3	92.0	90.5	92.5	90.6	87.1	84.8	84.5	88.1	90.6	92.1	94.8	94.6	92.1	87.5	82.6	93.1	140.5
10000	88.9	90.6	89.6	90.9	89.8	85.4	83.6	81.7	85.2	87.6	89.4	91.2	91.9	88.0	84.7	79.4	91.6	139.0
12500	85.9	87.4	86.7	87.4	87.5	81.9	82.4	78.8	81.7	84.8	86.1	88.6	88.1	84.9	81.4	76.8	89.9	137.3
16000	81.4	82.8	84.7	82.7	85.7	77.1	81.0	75.7	76.0	79.0	81.5	82.5	84.5	80.4	77.6	72.2	87.9	135.3
20000	76.9	80.2	83.3	79.6	84.6	74.1	81.9	73.2	70.0	74.1	76.5	78.4	79.5	75.6	73.3	65.9	88.1	135.5
OVERALL	103.1	104.5	102.6	103.6	101.6	99.1	96.9	97.6	99.2	102.4	103.5	104.4	106.3	103.2	99.0	96.0	103.5	150.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	75.5	87.9	90.7	94.9	94.7	94.3	92.8	94.4	96.0	98.8	99.4	98.9	99.2	94.4	86.9	79.1		

TABLE IV. - Continued. NOISE OF QF-3 CONFIGURATION 31 - TAPED INLET WITH RINGS, TAPED EXHAUST, NO SPLITTER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2821 rpm; fundamental blade passage frequency, 2491 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	82.3	76.8	81.6	83.4	80.8	79.8	77.3	76.6	76.8	79.3	80.6	83.4	77.8	82.1	84.8	86.8	81.0	128.4
63	72.3	74.8	74.1	74.3	73.6	74.1	74.3	74.9	73.8	75.9	77.8	82.4	79.3	82.4	84.3	86.5	78.9	126.3
80	74.6	74.5	74.0	72.5	73.1	72.3	73.1	74.1	73.1	77.0	79.5	83.1	82.3	86.0	88.1	88.9	81.0	128.4
100	81.0	78.5	80.4	76.9	74.2	74.7	76.2	78.2	78.0	81.2	83.4	84.9	85.0	87.7	89.2	89.7	83.1	130.5
125	78.8	78.0	77.8	77.1	77.5	77.5	78.5	80.3	80.0	83.1	84.6	85.1	86.0	87.3	89.1	88.7	83.5	130.9
160	80.5	80.5	80.5	78.5	79.3	79.6	80.5	81.1	80.0	83.1	83.6	84.1	84.8	86.1	86.8	85.7	82.8	130.2
200	80.7	80.0	80.3	78.8	79.5	79.0	78.7	79.2	77.5	79.8	81.0	82.0	83.7	84.5	85.3	84.7	81.2	128.6
250	80.9	82.0	80.0	78.4	78.7	77.4	77.5	78.7	78.0	81.2	83.0	83.9	85.0	85.9	86.4	83.9	82.0	129.4
315	80.5	80.7	79.7	79.2	79.7	79.2	79.5	80.7	80.0	82.3	83.3	83.5	84.3	85.0	84.7	82.6	82.0	129.4
400	83.0	81.5	80.1	79.3	79.3	78.1	77.8	78.5	78.1	81.0	82.3	82.5	84.5	84.6	84.3	81.5	81.4	128.8
500	84.5	83.7	80.5	79.9	79.9	78.5	78.5	79.9	78.7	81.4	82.4	82.7	83.9	84.4	83.4	80.1	81.6	129.0
630	85.3	85.0	81.7	81.5	80.8	79.0	78.8	79.5	79.2	82.2	82.8	83.0	84.2	84.3	82.7	79.4	82.0	129.4
800	86.7	86.0	83.7	83.2	82.2	80.2	80.3	80.8	80.7	83.7	84.5	84.2	85.8	85.7	82.8	79.7	83.4	130.8
1000	89.2	87.7	85.7	84.7	84.2	81.9	81.5	82.0	81.9	85.4	86.0	86.2	87.2	86.7	82.8	80.1	84.9	132.3
1250	88.9	88.3	87.3	85.5	85.3	83.1	82.4	83.6	83.6	87.3	87.9	88.1	89.4	87.8	83.1	80.3	86.5	133.9
1600	89.1	89.3	89.0	87.5	86.6	84.0	83.3	85.1	85.8	89.1	90.5	90.7	92.0	89.0	84.3	81.7	88.4	135.8
2000	91.9	92.2	91.7	91.4	89.7	87.4	86.0	88.4	88.7	92.0	94.0	93.2	95.0	91.7	86.4	83.4	91.5	138.9
2500	100.4	101.6	102.3	102.9	100.9	98.4	95.1	95.8	96.6	98.4	101.4	99.8	104.1	99.4	93.3	89.8	100.3	147.7
3150	93.1	93.8	93.3	92.6	91.3	88.4	88.4	91.0	92.0	95.0	96.2	96.0	97.4	94.2	88.8	84.9	94.1	141.5
4000	94.0	94.4	94.2	93.9	92.4	89.9	89.4	92.0	93.7	96.2	97.9	97.7	98.9	95.0	90.0	86.1	95.7	143.1
5000	96.6	98.0	97.8	97.1	97.6	93.0	91.8	93.8	94.8	97.3	98.5	100.3	102.5	97.1	94.0	88.4	98.5	145.9
6300	92.5	93.5	92.6	93.4	91.9	88.6	87.5	89.5	91.0	94.3	97.4	97.4	99.5	93.4	91.6	84.7	95.7	143.1
8000	92.8	94.5	93.5	94.8	92.8	90.3	87.9	89.4	91.9	94.4	96.9	98.4	98.1	94.8	91.1	85.6	96.6	144.0
10000	90.4	91.7	90.9	91.7	90.2	87.2	85.2	86.0	88.5	91.5	93.7	94.4	95.0	90.4	88.7	81.9	94.3	141.7
12500	89.3	91.0	89.9	90.4	88.8	85.2	82.8	83.5	85.3	88.8	91.0	91.8	91.0	87.3	84.5	79.7	93.1	140.5
16000	83.5	83.8	84.2	83.7	83.7	78.7	76.0	78.5	80.4	83.5	86.6	86.6	88.2	83.2	81.5	75.0	90.1	137.5
20000	78.5	78.9	79.3	79.3	79.1	73.2	71.6	72.3	75.0	79.0	81.6	83.2	84.0	78.8	76.8	69.6	88.4	135.8
OVERALL	105.1	106.0	105.9	106.1	104.7	101.8	99.9	101.4	102.5	105.1	107.2	107.4	109.4	105.4	102.2	99.4	106.4	153.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	78.0	90.0	95.5	98.9	99.6	98.6	97.4	99.1	100.0	102.2	103.9	102.4	103.8	98.0	90.5	82.1		

TABLE IV. - Concluded. NOISE OF QF-3 CONFIGURATION 31 - TAPED INLET WITH RINGS, TAPED EXHAUST, NO SPLITTER

[Data adjusted to standard day of 15^{o} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3173 rpm; fundamental blade passage frequency, 2802 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	82.2	79.9	81.9	80.9	81.4	80.2	80.9	81.9	79.1	82.9	82.6	84.2	83.2	86.6	89.1	91.0	83.7	131.1
63	76.0	78.8	77.6	76.8	78.0	74.0	77.8	78.3	77.0	79.6	81.0	83.3	83.5	87.0	89.3	90.9	82.7	130.1
80	77.6	77.2	75.2	75.6	76.1	75.7	76.6	77.4	76.6	80.4	82.4	85.1	85.7	89.4	92.4	93.1	84.6	132.0
100	84.8	81.1	81.8	82.1	82.1	80.8	79.6	82.0	81.8	85.0	86.5	88.5	88.6	92.1	94.0	94.5	87.3	134.7
125	82.3	80.8	82.0	81.0	80.3	81.3	82.3	83.8	83.5	87.2	88.2	88.7	89.5	92.2	94.2	93.4	87.7	135.1
160	84.1	83.9	83.8	82.8	82.9	83.8	84.4	85.3	84.1	86.8	87.4	88.4	88.9	91.3	91.8	90.5	87.1	134.5
200	83.3	83.8	83.0	82.1	82.8	82.1	83.1	83.1	81.3	84.0	85.0	86.0	87.6	89.3	90.6	88.2	85.3	132.7
250	82.0	83.1	82.5	82.0	81.5	81.5	81.1	82.5	81.6	85.0	86.5	87.3	89.0	90.6	91.1	88.2	85.9	133.3
315	86.0	84.1	82.3	82.3	83.1	82.5	83.1	84.0	83.1	85.8	86.6	87.0	88.3	90.1	90.0	86.8	85.9	133.3
400	84.2	83.1	82.7	83.2	82.6	82.1	82.4	82.9	82.1	85.2	86.2	86.7	88.2	89.2	88.7	85.6	85.4	132.8
500	85.4	84.2	82.9	82.9	82.7	81.7	82.4	83.5	82.7	85.4	86.0	86.4	87.7	88.0	87.7	84.4	85.1	132.5
630	87.1	85.7	83.9	83.9	83.4	82.4	82.6	83.4	81.9	85.2	86.2	86.6	88.1	88.2	87.2	83.6	85.3	132.7
800	88.3	87.7	86.5	85.3	85.0	84.2	84.7	84.7	83.3	86.5	87.5	87.5	89.2	88.8	87.1	83.9	86.5	133.9
1000	90.0	88.9	88.2	86.9	86.0	85.4	85.3	86.0	85.1	88.3	88.5	89.6	90.3	88.6	86.5	83.5	87.7	135.1
1250	91.8	92.1	92.6	91.8	89.6	88.1	86.8	87.8	87.1	90.0	90.6	91.1	91.6	89.6	86.8	84.2	90.0	137.4
1600	91.8	93.2	94.2	91.8	91.7	89.2	87.2	89.2	88.3	91.3	93.0	92.7	93.8	90.3	87.5	84.7	91.4	138.8
2000	93.0	92.7	92.7	91.7	90.7	89.0	88.8	90.7	90.2	93.5	95.3	94.7	95.8	91.5	88.0	85.6	92.7	140.1
2500	98.8	100.3	99.6	99.5	98.0	95.8	94.1	95.6	96.5	99.6	99.8	102.8	101.6	96.3	91.8	90.4	99.1	146.5
3150	98.7	100.5	100.0	99.7	98.5	96.2	94.7	96.2	97.0	100.4	100.5	103.0	102.5	98.5	94.2	91.4	99.9	147.3
4000	95.1	96.1	96.5	96.1	95.3	93.6	93.1	94.5	95.5	98.6	100.1	100.6	100.8	95.6	91.5	88.2	98.0	145.4
5000	96.0	96.6	96.3	95.5	96.0	92.6	93.3	95.0	95.8	98.6	100.2	101.3	102.7	96.8	94.5	89.2	98.9	146.3
6300	94.3	95.0	94.4	94.7	94.3	91.9	91.7	92.9	94.0	97.7	100.4	100.2	102.1	95.7	94.4	88.0	98.5	145.9
8000	92.9	94.6	94.4	94.4	92.7	91.2	91.1	92.9	94.9	97.7	99.4	100.4	99.2	95.9	92.7	87.5	98.4	145.8
10000	90.2	91.7	91.2	92.2	90.0	88.7	88.3	89.8	91.6	94.5	96.8	97.0	97.3	93.0	91.2	84.5	96.6	144.0
12500	89.5	91.3	91.0	91.1	89.1	86.4	85.9	87.6	89.0	92.2	93.9	94.7	93.7	90.2	87.2	82.4	95.5	142.9
16000	84.8	86.1	86.1	85.8	85.1	81.1	80.4	83.3	84.1	86.8	89.7	89.6	90.6	86.0	84.1	77.9	92.9	140.3
20000	77.5	79.6	79.5	80.2	78.5	74.8	75.4	76.3	79.1	83.0	86.1	86.3	87.0	81.8	79.8	72.7	91.4	138.8
OVERALL	105.5	106.9	106.6	106.3	105.3	103.2	102.5	104.0	104.7	107.8	109.1	110.3	110.5	106.8	105.2	103.1	108.3	155.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	78.3	90.4	95.4	98.4	99.7	99.2	99.3	101.2	101.8	104.9	105.1	105.7	104.3	98.8	92.8	84.8		

TABLE V. - NOISE OF QF-3 CONFIGURATION 32 - TAPED INLET WITH RINGS, TAPED EXHAUST WITH SPLITTER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2116 rpm; fundamental blade passage frequency, 1869 hertz

FREQUENCY	ANGLE, DEG															AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	66.7	65.0	67.0	67.0	66.0	65.7	66.5	67.5	68.2	68.8	69.2	70.0	69.2	71.7	74.2	73.7	69.1	116.5
63	72.5	68.0	66.7	66.2	66.0	68.0	68.5	67.8	68.0	68.8	67.8	68.5	69.7	72.2	73.0	74.2	69.2	116.6
80	73.5	69.0	68.0	67.2	66.4	68.5	69.5	69.0	68.9	70.5	69.9	71.9	72.2	74.9	76.0	76.4	71.2	118.6
100	69.8	69.6	67.8	67.3	66.1	67.6	67.8	68.3	70.6	71.5	72.8	73.6	74.8	76.6	77.5	77.2	72.4	119.8
125	71.5	70.8	71.1	70.6	69.6	70.0	70.8	71.6	73.1	73.8	75.0	74.1	75.8	76.5	77.5	76.3	73.6	121.0
160	72.5	72.9	73.5	71.5	71.5	72.0	71.7	73.0	73.4	73.9	74.2	74.0	74.5	74.7	74.9	73.9	73.4	120.8
200	75.6	76.0	72.3	73.1	72.5	71.0	70.5	70.3	72.6	71.3	72.0	72.1	74.1	74.1	74.5	72.9	72.6	120.0
250	74.7	75.4	74.6	73.2	71.6	70.6	70.6	71.2	73.4	74.4	74.9	75.6	76.4	76.1	75.6	73.4	74.0	121.4
315	77.2	76.2	75.2	74.5	74.2	72.7	72.9	73.2	73.7	74.5	75.2	75.5	76.5	75.7	74.0	72.4	74.6	122.0
400	78.7	76.9	75.9	74.2	73.4	71.7	71.9	72.6	74.4	76.1	76.9	77.2	78.4	77.4	75.2	72.5	75.6	123.0
500	79.1	78.2	76.7	76.2	75.7	73.6	73.6	74.6	76.1	77.2	78.1	78.4	79.1	78.4	75.2	71.8	76.8	124.2
630	79.6	79.3	78.1	77.0	76.1	74.3	74.1	75.0	76.8	78.3	80.0	80.5	80.6	80.5	76.3	72.2	78.1	125.5
800	81.7	81.3	80.3	79.5	77.8	75.5	75.7	76.2	77.7	80.3	81.8	82.3	83.0	83.5	77.5	74.2	80.1	127.5
1000	84.3	83.8	82.6	82.0	80.3	77.2	76.8	77.7	79.7	82.4	83.2	83.8	85.3	85.5	79.9	76.7	82.1	129.5
1250	84.8	85.1	84.5	83.3	81.8	78.6	77.8	78.8	81.5	84.5	85.8	86.0	86.6	87.0	82.1	78.2	83.9	131.3
1600	85.4	90.4	88.9	88.0	85.5	82.5	80.5	81.2	84.2	87.0	88.0	88.7	90.0	90.2	84.7	81.1	87.2	134.6
2000	95.5	97.3	96.3	95.3	92.8	89.1	86.3	85.6	88.1	92.1	92.6	93.3	96.0	95.5	89.8	86.4	93.1	140.5
2500	88.0	89.8	89.6	89.0	86.5	82.8	80.6	82.6	86.0	88.3	89.1	89.5	90.1	89.8	83.3	80.0	87.9	135.3
3150	89.7	90.4	90.6	90.2	87.5	83.6	81.7	83.9	87.7	89.7	90.7	90.6	91.7	90.6	85.4	80.6	89.4	136.8
4000	92.4	94.4	93.9	94.0	91.5	87.0	83.9	84.4	87.9	90.7	92.0	91.7	94.0	92.5	88.7	82.4	91.8	139.2
5000	89.5	90.4	90.6	89.4	87.8	84.3	79.9	81.8	85.6	87.8	89.8	89.8	92.0	90.4	85.3	80.0	89.3	136.7
6300	89.0	89.8	89.1	89.5	87.3	83.0	79.1	79.6	84.0	85.8	89.0	90.1	92.0	88.6	86.0	78.7	89.1	136.5
8000	88.4	89.7	88.9	89.9	87.8	83.3	78.1	79.1	84.1	85.4	88.4	89.7	90.7	88.7	85.7	78.9	89.4	136.8
10000	85.7	86.4	86.4	87.0	85.2	81.1	75.5	75.4	80.7	82.9	85.5	85.3	87.5	84.5	82.4	74.7	87.2	134.6
12500	82.4	82.9	82.4	83.1	81.7	77.1	71.2	72.4	77.4	79.7	82.4	81.4	84.6	80.4	78.6	71.3	85.0	132.4
16000	77.8	79.1	79.6	78.5	77.4	72.0	66.0	66.6	70.1	75.5	77.1	77.0	78.0	75.3	74.2	65.9	82.1	129.5
20000	74.2	75.1	75.0	74.7	73.7	67.0	61.5	61.1	65.9	68.1	72.0	71.8	75.1	71.1	70.2	60.9	80.5	127.9
OVERALL	100.8	102.1	101.4	101.0	98.8	94.9	92.2	92.9	96.2	98.7	100.1	100.4	102.3	101.2	96.7	92.3	100.0	147.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	74.0	85.8	90.1	92.5	92.4	90.4	88.9	89.8	93.3	95.4	96.0	95.4	96.0	93.2	85.2	76.6		

TABLE V. - Continued. NOISE OF QF-3 CONFIGURATION 32 - TAPED INLET WITH RINGS, TAPED EXHAUST WITH SPLITTER

[Data adjusted to standard day of 15^{0} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2468 rpm; fundamental blade passage frequency, 2180 hertz

FREQUENCY	ANGLE, DEG															AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	72.1	69.6	69.9	71.2	71.4	71.4	71.6	71.7	72.1	72.9	74.7	74.9	73.6	76.7	78.2	80.1	73.9	121.3
63	68.2	70.4	70.4	69.4	71.4	69.1	69.6	70.2	70.4	71.1	73.6	74.6	74.6	77.6	79.2	80.1	73.6	121.0
80	73.4	72.4	76.3	69.6	73.8	71.6	70.3	70.1	71.4	73.8	76.6	77.4	78.4	80.3	81.3	82.7	76.2	123.6
100	70.5	70.1	71.6	70.6	73.4	72.9	73.1	73.3	74.3	76.6	79.6	80.1	80.4	82.3	83.1	83.3	78.0	125.4
125	74.8	73.9	74.9	73.9	75.6	74.3	75.6	76.9	77.6	79.1	80.3	80.4	81.6	82.1	83.3	82.3	79.0	126.4
160	75.5	76.7	77.1	75.6	76.2	75.5	76.7	77.1	77.6	78.1	79.2	80.1	79.4	79.6	80.2	79.1	78.1	125.5
200	76.1	76.3	76.1	75.0	76.1	74.0	74.5	74.8	74.8	75.6	77.0	77.3	78.5	79.0	79.3	78.4	76.5	123.9
250	78.2	78.3	77.7	77.5	76.3	73.5	74.8	75.7	77.2	78.7	79.5	80.0	81.0	80.8	80.2	78.5	78.3	125.7
315	79.0	78.8	78.2	78.8	77.2	75.5	76.5	77.0	78.0	79.0	79.2	80.2	80.2	80.2	79.2	77.4	78.5	125.9
400	80.7	79.7	78.9	77.7	75.7	74.9	76.0	76.5	77.9	79.9	80.9	81.0	81.7	80.9	79.0	76.3	79.1	126.5
500	82.2	81.0	79.3	79.0	77.7	76.2	77.3	77.7	79.7	80.8	81.9	81.9	82.4	80.7	78.3	76.1	80.0	127.4
630	81.7	81.6	80.4	80.1	78.6	76.9	77.6	78.4	79.7	81.6	83.4	83.7	83.9	82.7	78.6	76.0	81.1	128.5
800	83.8	83.8	82.6	81.9	80.4	78.3	78.9	79.8	81.4	83.9	85.3	85.9	85.9	85.3	79.8	77.0	83.1	130.5
1000	86.8	85.4	84.7	83.9	82.3	79.9	80.6	82.1	83.7	85.7	86.7	86.5	88.0	87.3	81.9	79.2	84.9	132.3
1250	86.6	86.9	86.8	85.3	83.8	80.9	81.6	83.1	85.6	88.1	89.3	89.8	90.1	88.9	83.4	80.8	87.0	134.4
1600	88.9	88.8	88.9	87.8	85.8	82.8	82.4	84.1	87.4	89.6	90.9	91.1	92.4	91.1	84.6	82.2	88.8	136.2
2000	95.1	97.2	96.1	97.9	95.6	93.9	88.9	90.4	93.4	94.4	96.9	97.6	99.6	96.2	89.6	86.6	96.0	143.4
2500	94.7	94.2	94.7	94.6	92.2	89.9	86.6	88.7	91.9	92.9	94.7	95.2	97.2	94.6	88.2	84.8	93.6	141.0
3150	91.3	92.7	92.5	92.0	89.7	86.5	85.7	88.0	91.7	93.2	94.7	94.2	95.3	92.5	87.3	83.4	92.5	139.9
4000	94.6	96.1	96.0	95.3	94.1	90.8	87.6	89.3	92.3	94.1	96.3	95.8	98.0	95.1	90.5	85.1	95.0	142.4
5000	93.1	94.4	94.9	93.7	92.4	88.7	85.7	87.2	90.6	92.4	94.7	95.3	97.2	93.9	89.2	84.7	94.0	141.4
6300	92.2	94.0	92.5	93.7	92.3	86.0	85.5	84.8	89.0	90.3	93.8	94.8	96.2	91.7	88.8	82.8	93.5	140.9
8000	90.9	92.9	91.6	92.8	90.5	86.9	83.9	84.8	88.9	89.9	92.9	93.8	95.4	91.9	88.6	82.7	93.3	140.7
10000	89.7	91.3	90.5	91.5	89.8	86.0	82.1	81.6	85.8	87.5	91.0	90.3	91.5	87.6	85.8	79.5	91.8	139.2
12500	86.0	87.2	87.0	87.0	85.8	82.0	77.6	78.8	82.0	84.8	87.7	87.0	88.5	84.3	82.5	76.4	89.6	137.0
16000	82.0	83.6	83.6	83.0	81.0	77.0	72.7	73.2	76.5	79.8	81.8	82.9	83.0	79.9	78.2	71.3	86.8	134.2
20000	77.3	79.0	79.0	78.7	76.5	72.0	67.4	67.6	71.5	73.9	76.7	77.6	78.7	75.3	72.7	66.6	84.7	132.1
OVERALL	103.9	104.1	104.1	103.9	102.1	95.2	96.3	97.7	100.8	102.3	104.5	104.8	106.5	103.6	99.2	95.7	103.8	151.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	77.0	86.8	92.4	95.2	95.4	94.6	92.5	94.4	97.6	98.9	100.4	99.7	99.9	95.1	86.8	78.7		

TABLE V. - Concluded. NOISE OF QF-3 CONFIGURATION 32 - TAPED INLET WITH RINGS, TAPED EXHAUST WITH SPLITTER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2815 rpm; fundamental blade passage frequency, 2486 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	83.9	75.7	82.5	80.7	78.4	75.0	78.7	78.7	78.7	77.4	78.0	79.2	77.0	81.2	83.5	85.1	79.7	127.1
63	71.4	72.9	73.1	72.6	72.9	72.3	72.6	73.3	74.6	75.4	76.4	78.8	78.3	82.4	83.6	85.3	77.7	125.1
80	73.7	73.2	72.9	72.1	72.4	72.2	72.4	73.9	75.2	76.9	78.2	81.4	81.9	84.6	86.2	87.6	79.8	127.2
100	79.1	77.2	78.9	74.6	73.2	73.4	75.2	77.7	78.9	80.9	82.6	83.4	85.1	87.1	88.2	88.4	82.3	129.7
125	77.7	77.2	78.0	76.9	76.2	76.7	77.7	79.5	81.5	82.5	83.5	84.7	85.2	86.7	88.2	87.1	82.8	130.2
160	79.9	79.9	80.0	79.2	78.2	78.9	79.9	81.0	81.9	82.0	82.7	84.7	83.7	85.5	85.4	84.4	82.3	129.7
200	80.1	80.6	79.8	80.1	77.9	77.6	78.3	79.4	79.8	79.8	80.6	81.9	82.9	84.3	84.8	82.8	80.9	128.3
250	80.4	81.8	80.3	79.1	78.4	77.8	78.1	79.3	81.3	82.4	83.3	84.9	85.6	85.4	85.6	83.2	82.4	129.8
315	81.3	81.6	80.6	80.6	79.5	79.4	80.1	81.1	82.1	83.1	83.6	84.8	84.9	85.1	84.4	82.0	82.6	130.0
400	84.1	82.8	81.5	80.8	79.5	78.6	80.0	81.0	82.5	84.1	85.0	85.8	86.1	85.3	83.3	81.4	83.3	130.7
500	85.2	84.3	82.8	82.2	80.7	80.3	81.5	82.7	84.3	85.5	86.3	86.5	86.5	85.5	82.8	80.2	84.3	131.7
630	85.7	85.2	83.4	83.2	81.4	80.5	81.4	82.7	84.5	86.0	87.4	87.4	87.4	85.9	82.9	80.4	84.9	132.3
800	86.9	85.9	84.9	84.7	82.6	81.6	82.4	83.7	86.2	88.1	88.7	89.1	89.1	87.4	82.9	80.8	86.4	133.8
1000	88.6	87.6	86.9	86.7	85.4	83.7	84.4	85.6	88.1	90.2	90.1	90.9	91.1	89.7	83.9	82.1	88.3	135.7
1250	89.3	88.3	88.2	87.5	85.5	84.3	85.3	87.3	90.0	91.8	92.8	92.7	93.0	91.3	85.2	83.2	90.1	137.5
1600	89.7	90.2	89.9	88.7	86.9	85.4	85.4	88.2	91.4	92.9	93.9	93.9	95.2	92.4	86.9	84.9	91.4	138.8
2000	92.4	92.6	93.1	91.9	89.6	87.7	87.2	90.4	93.1	94.6	96.1	96.1	97.6	93.4	88.2	85.6	93.6	141.0
2500	100.0	101.0	103.9	102.0	99.7	97.5	95.0	97.0	98.4	99.2	100.0	100.7	103.2	98.4	93.0	90.3	100.1	147.5
3150	93.5	94.2	94.1	93.7	91.1	88.9	89.1	92.3	94.6	96.3	97.5	97.5	98.3	95.1	90.1	86.5	95.3	142.7
4000	95.0	95.6	95.3	95.0	92.1	89.8	89.5	92.3	95.8	97.3	98.6	98.3	99.5	95.6	91.1	86.9	96.5	143.9
5000	97.3	98.3	99.3	98.6	96.1	93.9	91.9	93.1	95.6	97.8	99.3	100.1	101.3	96.9	92.3	88.5	98.5	145.9
6300	93.7	94.5	94.0	94.4	91.6	88.9	88.4	89.2	93.1	94.0	97.1	97.6	97.9	93.8	91.0	85.2	95.7	143.1
8000	93.9	95.5	94.5	96.0	93.6	90.5	88.8	89.8	94.1	94.5	97.6	97.6	98.8	95.0	92.0	86.3	97.1	144.5
10000	92.1	93.1	92.4	93.3	91.3	87.9	86.6	86.3	90.7	91.6	94.8	93.6	94.9	90.9	89.1	82.4	94.9	142.3
12500	90.6	91.0	91.1	90.7	89.3	85.7	84.6	84.0	87.2	89.5	92.2	90.9	92.4	87.9	85.7	79.9	93.8	141.2
16000	87.4	85.4	86.6	85.6	85.7	79.8	82.4	79.3	82.3	84.9	86.8	87.7	87.3	83.8	82.1	75.6	91.4	138.8
20000	84.9	81.6	87.1	82.3	83.1	75.6	80.7	75.6	78.6	79.3	82.6	83.1	83.9	79.7	77.0	71.0	90.7	138.1
OVERALL	105.5	106.2	107.3	106.4	104.1	101.8	100.6	102.3	104.9	106.2	107.8	108.1	109.3	105.7	102.1	99.3	107.0	154.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	77.9	89.9	96.9	96.8	98.6	98.2	97.8	100.3	102.5	103.4	104.0	103.6	103.8	98.0	90.4	82.6		

TABLE VI. - NOISE OF QF-3 CONFIGURATION 33 - TAPED INLET WITH RINGS, FULLY ACTIVE EXHAUST LINER

[Data adjusted to standard day of 15^{0} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2138 rpm; fundamental blade passage frequency, 1888 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	70.6	67.3	66.8	67.3	67.3	67.5	68.1	68.8	69.3	69.8	71.1	70.9	67.3	71.8	73.1	74.3	69.8	117.2
63	69.8	70.0	67.1	67.5	65.8	67.0	67.1	67.0	66.8	68.3	68.1	68.7	67.8	71.6	73.6	73.5	68.8	116.2
80	72.1	71.1	68.5	68.1	65.8	67.5	67.8	67.6	67.1	70.5	69.6	71.1	70.3	74.0	75.0	76.0	70.4	117.8
100	69.7	68.0	67.5	66.5	67.7	68.5	68.2	68.5	70.0	71.7	72.3	72.9	73.5	76.2	76.8	76.6	71.9	119.3
125	71.1	70.3	70.1	69.9	70.4	70.6	71.3	70.8	72.3	74.4	74.1	74.7	74.6	76.4	77.3	76.3	73.4	120.8
160	72.7	71.5	70.8	72.3	72.7	72.2	72.5	72.2	73.3	73.8	73.5	73.9	74.2	74.5	74.8	73.6	73.2	120.6
200	73.8	75.8	71.7	71.7	72.0	71.3	70.3	70.2	71.8	72.0	70.8	72.3	73.2	73.7	73.3	72.4	72.1	119.5
250	73.7	74.8	72.3	70.8	71.5	69.7	69.0	70.2	71.7	74.2	74.0	74.7	76.8	76.3	74.5	72.0	73.3	120.7
315	76.0	74.8	73.7	71.8	73.2	72.0	71.8	72.2	73.0	75.3	74.7	75.8	76.5	75.8	73.8	71.7	74.1	121.5
400	78.4	76.5	74.4	72.9	73.7	71.7	71.2	71.9	73.4	75.5	75.7	76.3	78.0	77.0	74.0	71.4	74.9	122.3
500	78.5	78.0	76.0	74.6	75.1	73.3	72.1	73.3	74.8	76.8	76.5	76.9	78.6	77.1	73.6	70.7	75.8	123.2
630	79.6	79.3	77.5	76.1	76.8	74.8	72.6	73.5	74.5	77.3	77.5	78.1	80.0	79.3	74.0	71.0	76.9	124.3
800	82.2	82.0	80.2	78.8	78.0	75.5	73.5	73.5	74.8	77.3	77.3	78.7	80.6	80.2	74.5	71.5	77.9	125.3
1000	84.7	83.3	81.7	81.3	79.5	76.7	74.3	74.5	74.7	77.0	76.5	77.6	79.8	80.0	75.0	72.2	78.5	125.9
1250	85.3	84.8	84.0	82.5	81.1	78.1	75.0	73.1	73.8	76.6	76.5	77.2	78.1	78.3	74.1	71.5	79.1	126.5
1600	89.5	89.9	88.7	87.7	86.0	82.2	78.0	75.4	75.0	77.0	76.3	76.9	78.3	77.2	74.5	73.2	82.8	130.2
2000	96.6	98.1	97.0	96.5	94.1	90.0	86.5	82.5	80.5	82.1	80.3	80.9	83.0	82.0	80.0	80.2	90.8	138.2
2500	88.5	89.8	89.5	88.1	86.5	83.8	78.6	76.0	75.3	76.3	75.2	75.6	77.2	76.0	74.2	73.2	83.3	130.7
3150	90.1	90.6	90.4	89.1	87.6	84.6	78.7	75.6	74.9	76.2	75.4	75.2	76.9	76.2	73.7	73.3	84.3	131.7
4000	93.4	94.4	93.7	93.2	91.7	88.5	82.4	79.0	77.0	77.9	77.4	76.7	79.5	78.7	77.2	75.8	88.2	135.6
5000	90.2	90.5	90.4	89.2	88.2	85.0	79.0	74.7	75.0	76.7	75.1	77.2	78.7	76.6	75.2	72.5	85.1	132.5
6300	89.9	89.8	89.4	88.1	87.6	85.1	78.1	74.8	75.3	77.3	78.5	80.7	82.3	80.5	76.1	72.7	85.3	132.7
8000	88.7	89.9	89.6	88.6	87.9	85.6	77.1	76.2	80.0	80.8	82.5	82.6	85.8	83.5	79.2	74.3	86.9	134.3
10000	86.3	87.3	86.9	86.1	85.9	83.6	75.4	76.1	81.0	82.2	83.7	83.5	85.0	82.3	78.7	72.9	86.6	134.0
12500	83.6	84.2	83.9	82.5	83.0	80.2	72.9	74.9	80.8	83.3	85.0	84.2	86.8	82.1	81.3	74.2	87.2	134.6
16000	80.1	79.8	80.1	78.7	79.4	75.3	69.0	70.1	73.8	79.0	78.9	79.5	80.6	78.7	75.9	69.4	84.2	131.6
20000	76.3	76.2	77.5	74.5	76.7	70.2	65.7	64.5	69.5	73.5	74.3	75.4	76.3	73.4	70.2	64.5	82.8	130.2
OVERALL	101.5	102.4	101.6	100.8	99.3	96.1	91.2	88.9	89.9	91.8	92.2	92.5	94.4	92.8	90.3	88.2	97.5	144.9

DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.5 METERS	74.6	86.2	90.3	92.7	93.1	91.2	88.2	85.9	85.4	87.0	85.5	85.3	85.6	82.7	77.2	71.4

TABLE VI. - Continued. NOISE OF QF-3 CONFIGURATION 33 - TAPED INLET WITH RINGS, FULLY ACTIVE EXHAUST LINER

[Data adjusted to standard day of 15^{o} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2402 rpm; fundamental blade passage frequency, 2201 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	73.2	69.7	71.7	71.0	70.9	72.0	71.4	72.4	72.9	74.7	74.5	76.1	71.4	77.0	78.9	80.1	74.3	121.7
63	69.0	71.0	70.0	69.2	69.9	70.0	70.2	70.0	70.4	72.5	73.0	75.1	72.4	77.7	79.2	79.7	73.5	120.9
80	75.0	71.5	77.9	69.7	70.4	69.2	69.4	69.2	71.9	75.0	75.5	76.4	75.2	80.0	81.5	81.7	75.6	123.0
100	71.5	70.0	70.9	69.0	69.5	70.0	71.0	72.4	73.5	77.0	77.4	78.8	79.4	81.7	82.9	83.1	77.1	124.5
125	73.5	72.5	73.5	72.7	73.0	73.5	76.2	75.7	76.3	79.0	78.7	80.4	80.2	82.2	83.3	82.2	78.4	125.8
160	74.9	74.6	74.7	74.9	75.1	75.7	76.7	76.2	77.1	78.4	77.9	79.8	79.1	80.2	81.1	79.6	77.8	125.2
200	74.0	74.0	74.5	73.4	74.2	73.2	74.2	73.9	74.2	75.9	75.2	77.3	77.4	79.0	79.5	77.6	75.8	123.2
250	78.0	77.5	76.0	75.0	75.5	72.4	73.9	74.0	75.9	78.4	78.4	79.5	80.5	80.7	80.7	77.6	77.6	125.0
315	77.4	76.7	76.0	75.7	75.9	75.0	76.4	76.7	77.0	79.2	79.5	80.5	80.0	79.9	79.5	76.4	78.1	125.5
400	80.1	78.9	77.1	76.6	75.9	74.6	75.4	75.3	76.8	79.4	80.1	80.3	81.6	80.8	78.6	75.6	78.5	125.9
500	81.3	80.0	78.8	78.2	77.2	75.7	76.5	76.8	77.8	80.8	80.8	81.3	81.5	80.7	78.2	75.1	79.3	126.7
630	83.2	81.4	81.0	79.9	78.2	76.4	76.4	76.9	78.0	81.0	81.7	82.1	82.5	81.5	77.5	75.1	80.1	127.5
800	85.5	83.8	83.2	82.2	80.7	78.0	77.2	77.3	78.2	80.7	81.2	82.4	84.0	83.0	78.0	75.4	81.1	128.5
1000	88.0	85.7	85.1	83.7	82.0	78.9	78.5	77.7	78.2	81.4	81.2	81.5	83.4	83.4	78.2	75.6	81.8	129.2
1250	88.1	86.8	86.8	84.8	82.8	80.0	78.1	77.1	77.8	81.0	80.6	81.6	82.1	82.1	77.6	75.2	82.1	129.5
1600	89.4	89.1	88.9	87.4	85.0	81.8	79.1	77.3	77.6	80.6	80.1	81.0	81.8	80.9	77.1	74.8	83.3	130.7
2000	98.0	98.4	98.9	100.5	98.0	93.2	89.2	85.9	84.0	85.5	84.2	83.3	85.9	83.9	83.5	81.3	93.6	141.0
2500	95.8	96.3	96.5	98.1	95.7	91.0	86.8	83.8	82.0	83.3	82.0	81.9	83.7	81.8	81.5	79.4	91.4	138.8
3150	92.3	93.1	93.1	91.6	89.8	86.3	82.3	79.3	78.3	79.5	79.3	79.4	80.6	79.5	77.6	76.4	86.9	134.3
4000	95.3	96.4	96.8	95.6	94.3	90.9	86.6	82.6	80.4	81.6	80.4	80.5	82.6	81.8	79.9	78.2	90.8	138.2
5000	94.3	95.3	95.3	95.0	93.1	90.0	86.0	81.3	79.8	80.8	79.3	80.9	82.3	80.3	79.6	77.1	90.1	137.5
6300	93.3	93.5	94.0	93.4	92.0	89.5	84.6	80.3	79.0	80.3	81.7	82.9	84.5	82.2	78.5	76.1	89.5	136.9
8000	91.4	93.2	93.9	91.9	91.4	89.1	82.5	79.3	80.5	81.5	83.5	84.1	86.8	83.8	80.3	76.3	89.8	137.2
10000	90.7	91.7	91.7	90.7	89.9	88.0	81.9	79.1	80.5	81.5	83.5	82.8	84.3	81.4	78.6	74.0	89.4	136.8
12500	87.9	88.6	88.7	87.2	87.1	84.7	79.6	79.0	82.4	85.3	86.8	85.5	87.8	83.1	81.6	74.9	89.9	137.3
16000	84.2	84.3	84.5	83.5	82.6	80.0	75.5	75.9	78.6	83.4	83.6	83.8	84.9	82.6	79.7	73.3	88.6	136.0
20000	80.1	80.6	80.8	78.6	78.1	75.0	70.8	71.3	75.2	78.6	80.0	80.3	80.5	77.7	74.5	68.6	87.1	134.5
OVERALL	104.3	104.8	105.1	105.2	103.3	99.7	95.7	93.0	92.9	95.1	95.3	95.7	97.0	95.7	94.3	92.4	101.0	148.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	76.6	87.5	93.0	96.7	96.8	94.4	91.9	89.8	89.0	90.7	89.6	88.8	89.0	85.8	81.4	74.4		

TABLE VI. - Continued. NOISE OF QF-3 CONFIGURATION 33 - TAPED INLET WITH RINGS, FULLY ACTIVE EXHAUST LINER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2845 rpm; fundamental blade passage frequency, 2513 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	84.3	75.3	77.8	76.7	76.7	75.2	76.5	75.7	76.7	79.3	81.0	80.4	76.5	82.0	84.0	84.4	79.3	126.7
63	71.8	73.5	73.0	73.2	73.3	73.0	73.8	73.5	74.5	76.7	76.8	78.4	76.5	81.8	82.8	84.0	77.3	124.7
80	74.3	73.8	72.3	72.0	71.8	72.3	72.0	73.5	74.2	76.8	78.3	80.6	80.0	84.3	85.8	86.7	79.2	126.6
100	80.0	76.0	78.4	74.5	73.0	74.7	75.0	77.0	79.0	81.2	81.9	83.8	84.0	87.2	88.5	88.1	82.2	129.6
125	77.2	75.5	75.7	75.9	77.4	77.0	78.5	79.5	81.0	83.2	83.0	85.1	84.7	87.7	88.0	86.9	82.9	130.3
160	77.9	76.2	76.0	77.5	78.5	79.2	80.0	81.0	81.7	83.4	82.7	83.8	83.4	85.7	85.9	84.1	82.2	129.6
200	77.2	78.0	77.7	76.0	77.7	77.3	77.8	78.3	78.0	80.3	79.8	81.6	82.3	83.7	84.3	82.4	80.2	127.6
250	79.2	79.2	77.8	77.2	77.2	76.3	77.2	78.3	79.2	82.2	82.5	83.9	85.2	85.3	85.3	82.4	81.6	129.0
315	79.6	79.1	78.9	78.4	79.1	78.6	79.4	80.6	81.2	83.4	82.9	84.3	84.6	84.6	84.1	81.3	82.0	129.4
400	81.6	80.6	80.5	78.5	78.8	77.6	78.6	79.6	80.6	83.1	83.1	84.1	85.5	84.8	83.6	80.7	82.1	129.5
500	83.7	83.0	81.7	80.2	80.0	78.5	80.0	80.7	82.2	84.3	84.0	84.6	85.0	84.3	82.7	79.0	82.7	130.1
630	85.5	84.7	83.3	81.7	81.0	79.5	79.8	81.2	82.0	85.2	85.0	85.8	86.0	84.7	82.2	78.9	83.5	130.9
800	86.9	86.2	85.7	83.7	82.6	80.2	80.4	81.1	82.1	84.6	84.7	86.3	87.4	85.7	82.1	79.0	84.2	131.6
1000	89.4	88.1	87.4	85.4	84.9	81.8	81.6	81.8	82.8	85.3	84.9	86.0	87.6	85.9	81.8	79.1	85.0	132.4
1250	89.7	88.7	88.5	86.5	85.5	82.3	82.0	81.5	82.5	85.7	85.0	85.7	86.5	85.2	81.3	78.4	85.2	132.6
1600	90.3	90.3	90.2	88.2	86.7	83.3	81.8	81.2	82.2	85.0	84.7	85.4	86.0	83.5	80.5	77.9	85.6	133.0
2000	92.4	93.0	93.4	91.5	90.2	87.0	83.9	82.4	82.7	84.5	84.7	85.0	86.0	83.4	81.2	79.1	87.7	135.1
2500	101.5	103.0	104.0	103.5	101.8	100.3	96.2	93.5	90.5	90.3	89.7	89.4	90.7	88.8	89.0	87.7	98.3	145.7
3150	94.4	94.7	94.9	93.5	92.4	88.9	85.4	83.0	81.9	83.0	83.2	83.5	84.9	82.9	81.0	79.1	89.1	136.5
4000	95.2	95.7	95.7	94.4	93.4	89.7	85.7	82.9	81.9	83.0	82.7	82.6	84.4	82.7	80.9	78.6	90.1	137.5
5000	98.3	99.4	100.3	98.8	96.3	95.4	91.8	87.8	85.4	85.4	83.9	85.4	86.6	83.6	83.3	81.0	94.8	142.2
6300	94.2	94.6	95.1	93.4	92.9	90.3	85.6	82.6	81.6	82.6	84.0	85.1	85.5	82.5	79.7	77.1	90.4	137.8
8000	94.4	96.1	96.8	95.3	95.1	93.1	87.8	85.0	84.1	84.5	87.3	86.9	89.8	86.1	83.1	79.4	93.3	140.7
10000	92.3	94.0	94.0	92.5	92.5	90.3	84.6	81.8	82.2	82.4	84.4	83.7	85.0	81.8	79.7	75.1	91.4	138.8
12500	90.6	92.1	91.9	90.4	90.6	87.9	82.8	81.7	84.1	86.7	87.8	86.4	88.2	83.0	82.0	76.0	92.1	139.5
16000	85.5	86.2	87.0	85.5	85.4	82.5	78.9	80.0	82.2	86.7	86.7	86.7	87.4	84.3	81.4	75.3	91.3	138.7
20000	80.5	81.8	82.3	80.6	80.2	78.1	74.1	76.3	79.7	82.6	84.2	84.0	83.8	80.1	77.3	71.5	90.3	137.7
OVERALL	106.2	107.2	107.9	106.8	105.7	103.6	99.8	97.7	96.9	98.6	98.7	99.2	100.2	99.0	98.2	96.7	103.8	151.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	78.7	91.0	97.0	99.4	100.3	99.9	97.5	96.0	94.6	95.4	94.6	94.0	93.6	90.2	86.3	79.5		

TABLE VI. - Concluded. NOISE OF QF-3 CONFIGURATION 33 - TAPED INLET WITH RINGS, FULLY ACTIVE EXHAUST LINER

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3203 rpm; fundamental blade passage frequency, 2829 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	83.9	77.4	79.9	78.7	79.9	79.2	79.6	80.7	81.4	84.6	82.6	83.5	79.4	86.2	88.2	89.3	83.0	130.4
63	76.7	77.5	77.3	77.8	76.7	77.2	77.2	77.8	78.5	80.8	81.2	82.6	80.7	85.8	88.2	89.2	81.8	129.2
80	77.9	77.0	75.9	76.4	76.2	76.7	76.7	77.2	78.5	81.5	82.4	84.6	84.5	88.9	90.7	91.4	83.7	131.1
100	86.4	82.9	81.2	79.7	78.7	78.9	80.4	81.9	82.9	85.0	85.4	87.8	87.9	91.7	93.2	92.9	86.6	134.0
125	81.2	79.1	79.2	80.9	80.7	81.1	82.9	83.6	84.7	87.1	87.7	89.5	89.4	91.7	92.6	91.4	87.2	134.6
160	80.7	80.4	81.9	82.7	82.9	83.4	84.2	84.7	85.5	87.2	86.9	88.3	88.5	90.2	90.7	89.4	86.6	134.0
200	80.5	81.0	81.2	81.9	81.9	81.4	82.0	82.0	82.9	84.5	84.4	86.1	86.9	88.2	89.2	86.9	84.6	132.0
250	81.4	82.2	81.6	80.4	80.9	80.9	81.6	82.4	83.6	86.4	86.9	88.0	88.9	90.2	90.4	86.9	85.9	133.3
315	86.2	83.4	82.4	81.9	83.2	82.9	83.5	84.2	85.0	87.4	86.7	88.3	88.7	89.0	88.7	85.4	86.1	133.5
400	83.6	82.6	82.6	82.0	82.0	81.6	82.6	83.5	84.5	86.8	87.0	88.2	89.1	88.8	88.1	84.7	85.9	133.3
500	85.1	84.0	83.3	82.8	82.3	82.1	83.5	84.5	85.8	88.3	87.8	88.4	88.6	88.3	87.3	83.7	86.3	133.7
630	88.1	86.1	84.6	84.0	83.3	82.8	83.5	84.6	86.0	89.0	88.8	89.6	89.8	88.1	86.6	82.9	87.0	134.4
800	89.1	87.6	87.2	85.7	84.6	83.7	84.2	84.7	86.1	88.6	88.6	90.0	90.9	88.9	86.4	82.8	87.5	134.9
1000	91.8	89.6	88.3	87.7	86.7	85.1	84.9	85.3	86.9	89.4	88.8	90.2	91.3	88.6	86.1	82.5	88.2	135.6
1250	91.5	91.2	90.9	89.7	89.2	86.7	85.5	85.4	86.9	89.9	89.0	89.8	90.5	87.9	85.4	81.8	88.8	136.2
1600	92.3	92.1	92.3	90.8	89.4	87.3	85.3	84.9	86.9	89.8	88.6	89.5	89.9	86.4	84.4	81.2	88.9	136.3
2000	94.2	93.5	93.3	92.2	90.7	87.8	85.8	85.5	86.7	89.0	89.0	89.1	89.8	86.3	84.2	81.4	89.5	136.9
2500	100.0	99.8	100.8	99.7	99.3	96.0	92.5	90.0	88.5	90.0	89.5	90.9	90.5	87.5	86.0	83.7	95.3	142.7
3150	101.9	101.6	102.8	101.8	101.9	98.4	94.6	92.1	89.4	90.9	89.8	91.0	91.4	88.9	86.9	85.2	97.5	144.9
4000	95.9	96.5	96.9	95.9	95.2	92.5	88.7	85.9	85.4	86.7	86.7	86.5	88.5	85.2	83.4	80.6	92.0	139.4
5000	97.4	98.1	98.3	96.6	95.8	93.1	89.4	85.1	85.8	87.1	85.4	88.1	88.1	84.1	83.6	80.2	93.1	140.5
6300	96.7	96.9	97.6	95.9	95.7	93.9	89.2	85.7	85.6	86.2	86.9	88.5	87.8	84.9	82.7	79.5	93.3	140.7
8000	95.0	96.2	97.0	95.4	95.7	94.1	87.0	85.2	86.6	87.3	89.5	89.4	90.8	87.0	84.1	80.2	93.9	141.3
10000	92.7	93.5	93.5	92.5	92.5	90.8	84.5	83.2	84.2	84.9	86.2	86.0	86.7	83.7	81.9	76.5	91.8	139.2
12500	92.0	93.2	93.2	91.3	91.5	89.7	84.4	83.2	85.1	87.4	88.5	87.0	87.6	83.3	82.6	76.8	93.1	140.5
16000	87.5	87.0	88.2	86.7	86.5	84.7	80.6	81.3	83.8	88.0	87.8	87.9	87.1	84.5	82.2	75.9	92.4	139.8
20000	83.1	82.3	84.0	81.5	81.6	79.9	77.3	79.3	82.6	85.3	85.4	85.5	84.9	81.3	78.8	73.0	92.1	139.5
OVERALL	107.6	107.6	108.3	107.0	106.8	104.2	100.8	99.4	99.7	101.9	101.7	102.7	103.1	102.2	102.0	100.5	105.1	152.5
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	79.2	90.7	97.1	99.5	101.5	100.3	98.3	97.1	96.5	98.2	97.1	97.3	96.3	92.4	88.0	80.6		

TABLE VII. - NOISE OF QF-3 CONFIGURATION 34 - SUPPRESSOR B, FIRST INLET SECTION ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2138 rpm; fundamental blade passage frequency, 1880 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	72.1	68.4	68.9	69.9	67.2	68.7	67.2	68.7	72.7	74.9	73.9	87.7	71.2	74.6	76.9	79.6	78.0	125.4
63	71.2	68.9	66.7	67.7	65.4	67.2	66.7	67.7	71.5	73.4	72.4	84.7	70.9	74.5	75.7	79.1	75.6	123.0
80	72.1	70.1	67.9	68.9	65.6	68.6	68.4	68.6	70.7	73.9	72.6	85.1	74.4	76.2	77.2	80.6	76.3	123.7
100	71.1	68.3	67.3	67.4	66.8	69.9	67.6	69.6	72.1	74.1	73.8	82.3	76.4	77.3	78.3	78.6	75.2	122.6
125	72.0	70.2	70.9	70.7	70.5	71.2	71.0	71.7	74.0	75.4	75.2	82.4	77.2	77.5	79.0	78.7	76.0	123.4
160	72.7	71.3	71.8	70.5	70.7	72.5	71.8	72.5	73.8	74.0	73.8	80.7	74.8	75.0	75.3	75.6	74.6	122.0
200	73.7	75.4	71.7	72.0	71.2	71.9	70.9	71.4	72.0	71.7	71.9	78.5	74.4	74.0	74.7	74.9	73.5	120.9
250	73.9	73.4	72.9	70.6	69.9	70.1	70.2	71.4	72.4	73.7	74.7	79.6	77.4	75.9	75.2	77.3	74.5	121.9
315	76.1	73.6	74.1	71.6	72.1	71.9	71.9	72.4	73.2	74.2	74.7	77.7	76.2	75.1	74.2	76.8	74.3	121.7
400	77.8	74.8	74.1	71.9	71.3	71.4	71.6	72.6	73.3	74.8	76.3	78.1	77.8	76.3	74.8	76.5	75.0	122.4
500	77.5	75.7	74.8	72.8	72.0	72.0	71.8	72.7	74.3	75.8	76.8	77.8	77.8	76.8	74.5	75.0	75.3	122.7
630	78.0	76.2	75.2	73.7	72.2	72.2	71.5	73.0	74.5	76.2	77.8	78.5	79.8	78.0	74.3	71.6	76.0	123.4
800	80.6	78.1	77.4	75.7	73.1	72.6	71.9	72.7	74.6	75.9	77.6	78.7	80.4	79.4	74.7	71.6	76.6	124.0
1000	81.6	78.3	77.1	76.0	73.0	72.6	72.1	72.8	74.1	76.0	76.8	77.6	80.0	79.0	74.6	71.3	76.3	123.7
1250	80.9	79.2	78.2	76.7	74.0	72.5	71.4	71.5	73.0	75.5	76.4	77.4	78.2	77.5	73.2	69.3	75.9	123.3
1600	83.8	83.8	82.8	80.9	76.1	75.6	72.4	71.8	72.4	74.8	75.6	76.3	77.4	75.6	72.6	69.0	77.5	124.9
2000	89.0	90.7	89.4	87.4	84.4	83.4	78.0	77.0	75.7	76.4	77.0	77.4	79.9	77.7	76.9	73.8	83.1	130.5
2500	83.7	83.4	82.7	80.4	77.5	75.4	72.0	71.4	72.4	73.4	73.9	74.2	75.4	73.9	71.0	67.9	77.0	124.4
3150	84.7	84.7	83.8	81.2	78.3	75.7	72.2	70.2	71.2	73.3	73.8	74.7	75.8	74.3	72.0	68.2	77.9	125.3
4000	88.9	89.4	88.4	85.9	82.6	79.9	74.9	72.7	72.9	74.6	75.1	75.6	77.9	76.8	74.9	71.0	82.1	129.5
5000	87.1	88.1	86.9	85.2	81.7	79.9	74.6	70.9	72.6	74.4	74.2	75.9	78.9	75.7	73.7	69.0	81.4	128.8
6300	87.0	87.9	87.6	86.2	82.7	80.4	75.2	72.2	74.2	77.2	78.1	78.7	81.9	80.1	76.6	71.5	83.0	130.4
8000	86.8	88.0	88.3	86.5	83.7	81.3	75.5	74.2	78.7	80.7	82.5	82.5	85.4	81.7	79.0	71.8	85.2	132.6
10000	84.6	86.5	86.8	85.3	83.1	80.8	75.7	75.4	80.1	82.3	83.6	81.9	84.4	80.7	78.9	71.2	85.6	133.0
12500	82.8	83.2	83.8	82.4	80.6	78.6	74.5	74.5	79.7	82.9	84.5	83.5	86.2	81.5	79.9	71.1	86.5	133.9
16000	79.6	78.5	81.0	77.8	77.1	73.3	73.1	69.6	72.8	78.0	78.6	77.6	80.1	77.5	75.5	67.7	83.4	130.8
20000	75.5	74.2	81.1	72.7	73.9	67.0	73.3	64.2	68.5	73.8	73.6	74.4	75.1	72.4	69.9	63.0	82.8	130.2
OVERALL	97.1	97.7	97.2	95.3	92.6	90.7	87.2	86.6	88.8	91.0	91.9	95.1	94.0	91.8	90.3	89.3	94.7	142.1
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	69.2	80.3	84.4	85.7	85.2	85.4	82.4	82.2	82.8	84.0	84.2	85.2	84.3	80.5	75.8	68.9		

TABLE VII. - Continued. NOISE OF QF-3 CONFIGURATION 34 - SUPPRESSOR B, FIRST INLET SECTION ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2492 rpm; fundamental blade passage frequency, 2201 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	74.0	71.2	71.5	71.4	71.2	74.9	75.7	75.0	75.4	76.5	75.7	81.4	73.7	77.4	79.2	86.8	77.4	124.8
63	71.6	71.1	69.6	70.1	69.9	72.7	73.9	72.9	73.2	74.4	74.1	79.1	74.6	77.6	79.9	86.6	76.4	123.8
80	75.9	73.6	75.7	70.4	71.2	73.1	74.1	72.7	73.9	76.2	75.2	79.1	77.4	80.2	81.9	86.9	77.5	124.9
100	74.2	71.4	70.4	70.0	70.0	72.4	73.4	74.0	75.7	78.0	78.5	80.5	79.9	81.7	83.4	87.3	78.6	126.0
125	75.1	74.1	74.2	73.9	74.2	75.4	76.6	77.2	78.7	81.1	80.9	81.1	81.6	83.1	84.1	86.9	80.1	127.5
160	75.1	73.8	74.6	74.6	75.3	76.4	76.9	77.6	77.8	79.3	78.8	79.6	78.8	79.9	80.6	84.3	78.4	125.8
200	74.8	74.1	74.4	73.8	74.4	74.3	74.4	74.8	74.6	77.4	76.6	77.3	78.1	78.9	79.9	82.5	76.7	124.1
250	77.4	76.2	75.9	74.4	75.7	73.7	74.2	75.5	77.0	78.7	78.7	79.4	80.4	80.7	80.9	81.8	78.0	125.4
315	77.1	75.6	75.4	74.8	75.6	75.3	75.9	76.6	77.4	78.6	78.6	79.3	79.8	80.1	79.4	79.8	77.8	125.2
400	79.7	77.2	76.2	74.9	74.7	74.7	75.4	76.7	77.9	79.5	80.0	80.5	81.0	80.4	79.5	78.6	78.5	125.9
500	80.7	77.9	77.1	76.1	75.4	75.4	75.7	76.9	77.9	79.9	80.4	80.4	81.4	80.2	78.9	76.4	78.7	126.1
630	80.7	78.4	77.6	76.2	75.6	75.2	75.7	77.1	78.2	80.2	81.2	81.7	82.6	81.4	78.4	75.3	79.3	126.7
800	82.4	79.7	78.7	76.9	76.7	75.7	75.7	77.2	78.0	80.2	81.0	82.0	83.7	82.5	78.2	75.1	79.8	127.2
1000	85.2	80.9	79.4	78.1	77.1	76.1	76.1	77.1	78.2	80.2	80.6	81.1	83.1	82.6	78.2	74.3	79.8	127.2
1250	83.6	81.8	80.1	78.4	77.3	75.6	75.6	76.3	77.4	80.1	80.8	81.4	81.8	81.3	77.3	73.2	79.5	126.9
1600	84.6	83.4	81.9	80.8	78.1	75.9	74.8	75.1	76.4	79.4	79.9	80.1	80.9	79.6	76.3	72.0	79.3	126.7
2000	91.3	93.3	88.8	88.0	85.6	83.6	80.1	78.4	78.3	79.8	80.3	80.4	82.8	81.6	78.4	75.8	84.6	132.0
2500	89.4	90.4	86.9	85.5	83.4	81.0	77.9	76.7	76.9	78.1	78.5	79.0	81.4	79.7	76.9	73.6	82.5	129.9
3150	88.0	87.2	85.2	83.2	81.2	77.8	75.0	74.2	75.2	77.2	77.3	77.3	79.2	78.0	75.5	71.9	80.5	127.9
4000	92.0	91.3	89.8	88.2	85.5	82.5	77.8	76.0	76.5	77.5	78.2	78.5	81.0	79.5	77.5	73.6	84.4	131.8
5000	91.3	91.0	89.7	88.4	85.5	82.7	78.0	74.9	76.4	77.0	77.2	77.9	81.0	78.2	76.5	72.1	84.5	131.9
6300	90.9	91.1	90.7	89.4	87.6	84.1	79.1	76.9	77.3	79.4	80.8	81.1	83.1	81.4	78.8	74.2	86.2	133.6
8000	89.9	90.9	90.0	88.7	87.2	83.4	77.9	77.0	79.4	81.4	82.9	84.0	86.4	82.7	80.7	74.1	87.1	134.5
10000	89.2	90.2	90.1	88.7	87.6	83.9	78.3	77.4	79.9	81.5	82.9	81.3	83.4	80.1	78.8	71.6	87.6	135.0
12500	86.7	87.3	87.1	85.8	85.5	82.3	78.2	78.2	82.1	84.3	86.3	85.2	86.7	81.8	80.5	72.6	88.8	136.2
16000	83.3	82.9	83.8	81.7	82.2	77.7	74.5	75.0	78.3	82.0	83.0	82.7	83.3	81.2	79.7	70.9	87.5	134.9
20000	80.2	78.8	81.6	76.6	79.8	71.5	71.0	70.3	74.2	78.2	78.6	78.7	79.0	75.7	74.2	66.2	86.3	133.7
OVERALL	100.5	100.7	99.2	97.8	96.3	93.5	90.7	90.5	91.9	93.9	94.7	95.1	96.2	94.9	93.9	95.6	97.4	144.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	71.7	82.9	85.3	87.4	87.8	87.3	85.6	85.3	86.2	87.7	87.6	87.2	87.4	84.4	79.1	72.9		

TABLE VII. - Continued. NOISE OF QF-3 CONFIGURATION 34 - SUPPRESSOR B, FIRST INLET SECTION ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2848 rpm; fundamental blade passage frequency, 2515 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	83.3	75.4	75.9	81.3	79.5	79.1	75.4	76.8	77.1	91.8	80.1	81.1	76.8	81.3	83.8	83.5	83.5	130.9
63	71.8	73.6	73.5	73.0	73.3	73.8	73.6	74.6	75.0	78.8	77.6	79.6	77.0	81.6	83.8	83.7	77.9	125.3
80	74.4	73.4	72.9	71.9	72.1	72.9	72.9	74.1	75.3	72.6	79.1	81.6	80.9	84.4	86.8	86.0	79.5	126.9
100	78.5	76.8	78.0	75.5	73.5	75.1	76.8	77.6	79.0	75.5	82.0	83.8	84.0	86.5	88.6	86.8	81.8	129.2
125	77.2	75.3	76.0	75.8	77.5	78.2	79.7	80.5	81.8	74.8	83.8	85.7	85.3	87.0	89.2	86.6	83.0	130.4
160	77.5	76.7	78.0	77.7	79.1	79.8	80.1	81.0	81.5	74.8	82.6	83.6	83.0	84.6	85.6	82.5	81.5	128.9
200	77.3	77.3	77.5	78.0	78.0	78.3	77.8	78.0	78.5	75.5	80.0	81.6	83.0	83.8	84.5	80.5	80.0	127.4
250	78.6	78.1	77.8	76.6	77.5	77.8	77.8	78.6	80.3	76.5	83.0	84.1	84.6	85.1	85.1	81.3	81.3	128.7
315	79.1	77.5	77.8	78.0	78.5	79.1	80.0	80.5	81.6	77.8	82.5	83.6	84.0	84.3	84.0	79.7	81.3	128.7
400	80.7	78.2	78.1	77.6	77.9	78.4	79.1	79.9	81.6	78.1	83.9	84.4	85.1	84.4	83.7	78.6	81.7	129.1
500	82.1	79.5	79.4	78.6	78.6	79.2	79.6	80.7	82.2	79.1	84.4	84.9	85.1	84.1	82.7	78.1	82.1	129.5
630	83.6	81.1	79.9	78.6	78.4	79.2	79.6	80.9	82.1	80.2	85.1	85.6	85.9	84.2	82.1	77.3	82.5	129.9
800	84.6	81.6	80.8	79.6	79.8	79.3	79.8	80.8	82.5	81.5	85.5	86.0	87.0	85.1	82.0	77.8	83.1	130.5
1000	86.8	83.2	82.0	80.7	79.8	79.8	80.3	81.2	83.0	82.5	84.8	85.7	87.3	85.3	81.5	77.4	83.4	130.8
1250	86.3	83.3	82.4	81.1	80.3	79.6	80.1	80.8	82.8	83.3	85.4	85.8	85.8	84.6	80.9	76.3	83.3	130.7
1600	86.3	84.5	83.3	81.8	80.6	79.1	78.8	79.8	82.6	84.0	84.8	85.0	85.6	82.8	79.8	75.4	83.0	130.4
2000	88.5	86.7	85.5	83.9	82.2	80.5	78.5	79.7	81.8	85.3	84.7	84.2	85.2	82.2	79.7	75.2	83.6	131.0
2500	94.1	93.6	94.0	92.1	89.8	86.5	83.0	83.1	83.3	86.0	84.3	85.5	87.8	84.5	81.6	79.0	88.3	135.7
3150	90.0	88.2	87.5	84.8	83.0	80.3	77.8	78.0	79.5	87.0	81.7	81.8	83.7	81.3	78.7	74.7	83.9	131.3
4000	92.7	90.8	90.0	87.4	85.5	82.5	78.8	78.0	79.8	87.7	81.7	81.8	83.5	81.2	79.2	74.9	85.6	133.0
5000	94.3	94.0	94.2	92.8	90.7	88.7	83.7	80.0	81.0	88.3	81.8	82.8	85.5	81.2	80.2	75.6	89.2	136.6
6300	92.0	91.3	91.7	89.3	88.0	85.3	80.2	78.5	80.3	89.3	83.2	83.4	84.9	81.9	79.2	75.6	87.8	135.2
8000	92.7	92.9	94.1	92.1	91.1	88.6	82.6	81.1	82.9	89.9	86.7	87.1	88.9	84.9	83.1	76.4	90.9	138.3
10000	90.6	90.7	91.5	89.6	89.2	86.9	81.1	79.4	81.2	89.7	83.6	82.7	83.9	80.4	79.1	73.0	89.6	137.0
12500	89.2	90.2	90.5	88.9	88.9	86.9	81.6	80.5	83.7	89.9	86.9	85.9	86.7	81.7	80.2	73.1	91.4	138.8
16000	83.8	83.8	85.1	83.8	85.1	82.3	77.9	79.1	81.6	90.6	85.8	85.6	85.6	82.6	80.7	73.3	91.2	138.6
20000	78.3	79.4	80.7	78.7	78.6	75.8	73.8	75.3	79.4	90.7	82.8	83.0	82.3	78.4	76.2	69.5	92.0	139.4
OVERALL	102.4	101.6	101.9	100.1	98.9	96.9	94.0	94.0	95.6	100.6	98.1	98.6	99.4	98.0	97.7	94.8	100.8	148.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	73.6	83.8	89.3	90.9	91.5	90.8	89.3	89.9	91.1	94.1	92.2	92.1	92.1	88.0	83.1	74.6		

TABLE VII. - Concluded. NOISE OF QF-3 CONFIGURATION 34 - SUPPRESSOR B, FIRST INLET SECTION ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15^{o} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3203 rpm; fundamental blade passage frequency, 2829 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	83.1	77.1	81.9	78.6	81.3	79.3	80.1	81.3	81.1	81.6	82.6	83.8	79.8	85.6	87.8	88.0	82.6	130.0
63	76.2	76.5	77.2	76.2	77.0	77.2	77.3	78.0	78.3	79.8	80.8	82.8	81.2	86.0	88.5	89.1	81.8	129.2
80	78.8	75.8	75.6	74.8	75.3	75.8	76.1	77.1	78.8	80.8	82.8	85.1	85.1	89.0	91.8	91.2	84.0	131.4
100	85.3	80.8	80.8	78.3	78.4	79.4	80.8	82.1	83.3	84.6	86.1	87.9	88.6	91.4	93.3	91.6	86.5	133.9
125	81.8	78.0	79.3	79.1	80.8	81.6	83.0	84.3	86.1	87.0	88.0	89.1	89.5	92.0	93.8	90.9	87.5	134.9
160	80.5	79.5	81.3	81.6	82.6	83.8	84.1	84.8	85.3	86.0	86.1	87.6	87.6	89.0	90.3	87.3	85.9	133.3
200	80.5	80.2	81.0	81.4	81.7	82.5	82.0	82.7	82.7	83.0	84.2	85.7	87.4	88.7	89.7	85.7	84.6	132.0
250	81.0	80.2	81.0	80.3	81.2	81.2	82.0	83.2	84.7	85.5	86.8	88.3	89.3	89.8	90.2	86.2	85.9	133.3
315	85.8	82.3	81.7	81.3	83.3	83.3	83.5	84.3	85.2	85.5	86.2	87.5	88.8	89.2	88.8	84.7	85.8	133.2
400	82.9	80.4	81.2	80.5	81.2	81.5	82.7	83.7	85.1	86.2	87.2	88.1	88.7	88.6	88.2	83.6	85.7	133.1
500	84.1	81.4	81.4	81.4	81.6	82.7	83.4	84.6	85.9	86.7	88.1	88.1	89.1	87.9	87.2	82.8	86.0	133.4
630	86.8	83.0	82.6	82.0	82.1	82.8	83.5	85.1	86.3	87.5	89.0	89.0	90.1	88.0	86.6	82.0	86.6	134.0
800	87.4	83.9	83.4	82.7	82.5	83.4	83.7	85.2	86.4	87.4	88.9	89.9	91.0	88.5	86.4	81.8	87.0	134.4
1000	90.0	86.2	85.2	83.3	83.2	83.5	84.3	85.2	86.8	88.3	88.7	89.5	91.0	87.8	86.0	81.4	87.2	134.6
1250	89.3	86.0	85.6	84.5	83.8	83.3	84.1	85.1	87.0	88.3	89.0	89.1	90.0	87.6	85.3	80.3	87.1	134.5
1600	89.4	86.6	85.7	84.4	83.7	83.1	83.2	84.7	86.6	87.9	88.7	88.7	89.7	85.7	84.1	79.3	86.7	134.1
2000	90.7	88.0	86.9	85.5	84.0	83.2	82.7	84.7	86.2	87.5	89.0	88.4	89.7	85.7	83.9	78.8	86.9	134.3
2500	95.1	93.4	92.8	91.1	89.6	87.8	84.6	84.9	85.8	86.6	88.6	89.1	90.1	86.3	83.6	79.8	89.1	136.5
3150	96.4	94.4	94.2	92.2	90.9	88.7	84.5	84.7	85.2	86.2	87.4	88.6	90.7	86.9	84.2	80.3	89.9	137.3
4000	93.4	91.6	90.6	88.2	87.4	85.4	81.9	82.2	83.6	84.6	85.9	86.4	87.7	84.7	82.4	77.3	87.2	134.6
5000	95.5	94.2	93.0	91.0	89.2	88.2	83.2	81.5	83.7	83.7	84.7	86.0	87.5	83.0	81.5	77.0	88.8	136.2
6300	94.3	93.3	93.1	91.3	90.1	88.5	82.8	82.5	83.2	85.0	86.2	86.0	87.2	84.5	82.0	77.6	89.4	136.8
8000	93.1	93.2	93.6	91.3	90.3	88.3	82.7	82.8	85.5	87.2	89.3	89.3	90.7	86.3	84.3	77.7	91.1	138.5
10000	91.3	91.3	91.1	90.0	89.0	87.3	82.0	81.3	83.1	84.8	85.8	84.6	85.9	82.3	81.4	74.6	89.6	137.0
12500	90.3	91.1	91.1	90.1	89.6	88.3	82.6	82.1	84.2	86.4	87.8	86.4	86.7	82.1	80.9	73.7	91.7	139.1
16000	85.1	85.0	85.2	84.4	84.1	83.6	79.4	80.9	82.8	86.5	86.9	86.3	86.0	83.2	81.5	73.4	90.9	138.3
20000	79.7	80.0	81.0	78.9	78.7	77.8	76.0	78.4	81.5	85.1	84.4	83.9	83.5	79.8	77.8	70.6	90.7	138.1
OVERALL	104.4	102.9	102.6	101.0	100.1	99.0	96.9	97.7	99.0	100.3	101.4	101.9	102.9	101.8	102.1	99.4	102.2	149.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	75.8	85.0	90.4	92.2	93.5	93.7	92.3	93.2	94.5	95.3	96.3	96.0	95.9	91.4	86.9	78.0		

TABLE VIII. - NOISE OF QF-3 CONFIGURATION 35 - SUPPRESSOR B, FIRST TWO INLET SECTIONS ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2110 rpm; fundamental blade passage frequency, 1863 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	68.7	66.5	67.7	67.2	67.5	66.5	67.3	67.3	70.0	68.2	69.5	69.4	70.7	70.7	73.0	73.2	69.2	116.6
63	71.8	68.0	67.0	66.7	67.2	68.8	68.7	68.8	68.5	69.5	68.3	68.3	70.3	71.7	72.7	73.4	69.4	116.8
80	73.0	68.8	68.6	67.1	66.3	70.0	70.1	69.6	68.8	70.8	70.0	70.9	73.0	74.3	75.3	75.7	71.1	118.5
100	69.2	67.5	66.4	66.5	67.0	68.0	67.4	69.0	71.0	71.2	72.5	73.1	75.5	76.4	76.9	76.9	72.2	119.6
125	71.0	69.5	69.0	68.9	69.5	70.4	70.7	70.9	72.9	72.9	74.2	74.3	75.5	75.5	77.0	75.8	73.1	120.5
160	71.3	70.5	70.5	69.5	70.7	72.0	71.2	71.7	72.3	72.7	72.5	72.8	73.0	73.0	74.0	72.7	72.1	119.5
200	74.4	75.0	70.7	71.5	71.9	70.7	69.4	70.0	71.4	70.2	71.4	71.3	72.7	73.5	74.0	72.1	71.7	119.1
250	73.2	72.5	71.2	69.0	69.5	69.0	68.8	70.0	71.7	73.0	74.0	74.2	74.8	75.2	74.3	71.9	72.4	119.8
315	75.4	73.4	72.1	70.1	70.9	70.9	71.1	71.6	72.6	73.1	73.9	73.8	74.4	74.2	73.2	71.1	72.7	120.1
400	77.3	74.5	72.3	70.3	70.5	70.0	70.3	71.5	73.1	74.1	75.6	75.2	76.1	75.3	73.1	70.4	73.6	121.0
500	77.1	75.6	73.3	71.3	71.3	70.5	71.3	72.3	73.6	74.6	76.3	75.4	76.3	75.8	73.3	70.0	74.1	121.5
630	76.8	75.4	73.1	71.8	71.1	70.8	71.1	72.1	73.6	74.8	77.3	76.9	77.8	76.9	73.3	69.5	74.7	122.1
800	79.0	77.0	74.9	73.0	71.7	70.7	71.0	71.9	73.9	75.4	76.9	77.5	78.9	78.7	73.4	70.1	75.4	122.8
1000	80.2	77.2	75.0	73.0	71.9	70.7	71.0	71.7	73.2	75.0	76.0	76.0	78.0	78.7	73.4	70.1	75.0	122.4
1250	79.5	77.6	75.3	74.1	72.1	70.5	70.3	70.5	72.0	74.1	75.6	76.0	76.4	76.8	71.8	68.2	74.4	121.8
1600	82.8	82.7	80.5	77.7	76.2	72.6	70.6	70.1	71.0	73.1	74.5	74.7	75.3	75.3	70.6	68.9	75.7	123.1
2000	88.1	89.6	87.1	83.3	83.6	78.8	75.8	73.0	73.5	74.5	75.3	75.2	77.0	77.5	73.5	73.4	81.0	128.4
2500	80.3	80.8	78.9	76.4	74.3	71.3	68.3	68.1	69.8	70.8	72.1	72.7	72.9	73.1	68.8	66.3	74.0	121.4
3150	83.1	82.3	81.1	77.9	76.1	72.4	68.8	68.1	69.6	70.8	72.1	73.0	73.3	73.1	69.9	67.3	75.5	122.9
4000	88.0	87.0	86.0	83.0	80.2	76.3	71.8	70.0	71.3	72.2	73.8	74.6	75.7	75.8	72.5	69.9	79.8	127.2
5000	86.8	85.8	83.7	81.3	79.5	75.8	71.7	68.7	71.3	72.0	72.8	74.5	76.0	76.2	72.0	67.9	78.9	126.3
6300	87.1	87.6	86.8	84.0	83.1	79.0	72.1	71.1	73.8	74.8	77.8	80.1	81.8	78.0	76.3	71.1	82.3	129.7
8000	87.1	88.1	87.4	85.5	84.1	80.3	73.6	73.7	79.2	79.8	81.5	82.8	84.8	82.3	77.6	72.3	84.8	132.2
10000	85.9	86.6	86.4	84.8	84.3	81.1	74.5	76.1	81.2	81.4	84.1	83.2	84.7	81.5	78.2	72.2	85.9	133.3
12500	83.6	83.6	83.6	82.4	82.3	79.4	73.5	74.9	81.0	83.1	85.1	84.1	86.1	83.4	80.6	72.6	87.0	134.4
16000	79.0	80.2	79.8	78.0	77.5	74.0	67.4	70.3	74.8	77.1	79.0	79.8	80.6	77.8	75.6	68.1	83.7	131.1
20000	74.4	75.1	74.8	73.2	71.6	67.3	61.6	63.6	69.9	71.8	74.2	75.9	74.4	72.1	69.8	62.6	81.3	128.7
OVERALL	96.6	96.7	95.5	93.1	92.2	89.0	85.4	85.6	88.7	89.7	91.6	91.6	93.1	91.6	89.0	86.2	93.9	141.3
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	68.2	79.0	82.1	82.4	84.1	82.1	80.4	79.8	81.4	82.2	82.9	82.3	82.1	79.9	73.5	66.9		

TABLE VIII. - Continued. NOISE OF QF-3 CONFIGURATION 35 - SUPPRESSOR B,

FIRST TWO INLET SECTIONS ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2461 rpm; fundamental blade passage frequency, 2173 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	72.2	68.8	70.0	70.5	70.7	71.7	71.2	72.0	72.8	72.6	74.8	74.8	75.5	76.8	78.3	79.4	74.0	121.4
63	64.6	69.9	69.1	67.9	69.4	68.6	68.7	69.2	70.4	70.6	73.1	74.0	75.1	77.1	78.7	78.8	73.0	120.4
80	73.8	72.3	76.0	69.7	69.2	69.3	68.5	69.3	71.3	73.5	75.2	75.9	78.3	80.2	81.0	82.6	75.6	123.0
100	71.5	69.5	70.0	68.7	69.0	70.0	71.0	72.5	74.5	75.7	77.8	78.6	80.5	81.7	82.3	82.9	77.1	124.5
125	72.8	71.5	72.5	72.0	72.5	73.2	74.0	75.7	76.8	77.8	78.8	79.9	80.7	81.7	82.8	81.2	78.0	125.4
160	74.4	73.2	73.9	74.2	75.1	75.4	75.9	76.2	76.7	77.9	78.1	78.8	78.9	78.9	79.9	78.3	77.2	124.6
200	73.9	73.3	73.1	73.1	73.3	72.9	73.1	72.9	73.8	74.3	75.4	76.5	77.9	78.4	79.3	77.2	75.3	122.7
250	76.6	76.6	74.9	74.2	74.7	72.9	73.4	74.4	76.4	77.7	78.6	79.2	79.7	80.1	80.1	77.3	77.2	124.6
315	76.3	75.0	74.1	74.0	74.6	74.8	75.1	76.0	76.6	78.0	78.3	78.5	79.0	79.3	78.8	76.2	77.0	124.4
400	78.0	76.6	74.7	73.5	73.3	73.5	74.3	75.3	76.5	78.3	79.7	79.9	80.2	79.7	78.2	75.4	77.5	124.9
500	79.5	77.2	75.0	74.7	74.4	74.2	74.5	76.0	77.5	78.9	79.9	80.1	80.0	79.2	77.7	74.1	77.8	125.2
630	79.7	77.6	75.7	74.9	73.9	74.6	74.9	76.2	77.6	79.6	80.9	81.3	81.4	80.4	77.2	74.0	78.5	125.9
800	81.8	79.4	76.8	75.6	75.1	74.6	75.3	76.3	77.9	79.1	80.6	81.7	82.6	81.8	77.1	74.1	79.0	126.4
1000	83.6	81.1	78.3	76.4	76.3	74.9	75.1	76.1	78.1	79.8	80.6	80.4	82.4	82.4	77.1	74.0	79.2	126.6
1250	82.2	80.0	77.7	76.7	75.5	74.2	74.3	75.2	77.0	79.2	80.2	80.3	80.7	80.8	76.0	72.7	78.4	125.8
1600	82.5	81.5	79.7	78.0	76.0	73.9	73.2	73.9	75.9	76.2	79.0	79.3	79.9	79.2	74.5	71.6	77.9	125.3
2000	87.9	90.1	87.1	85.1	82.6	80.4	78.1	76.7	77.1	78.6	79.6	80.7	82.4	81.7	76.7	75.6	82.4	129.8
2500	84.7	85.4	83.5	81.2	79.5	76.5	74.4	74.0	75.2	76.4	77.9	78.3	79.7	78.7	74.4	72.4	79.2	126.6
3150	85.4	84.0	82.5	79.9	78.4	74.5	72.0	72.0	73.9	75.4	77.0	77.1	77.8	76.7	73.7	70.8	78.2	125.6
4000	90.2	89.0	87.8	85.0	82.2	78.3	74.7	73.2	75.3	76.5	77.2	78.1	79.7	79.0	75.0	72.6	82.1	129.5
5000	89.0	88.4	86.7	84.5	81.9	78.1	74.7	72.2	75.0	75.5	76.4	77.3	79.2	78.5	74.5	71.3	81.7	129.1
6300	90.2	90.7	90.6	87.7	86.9	82.7	76.5	74.9	76.7	78.1	80.6	82.1	83.4	79.4	78.1	73.8	85.5	132.9
8000	88.8	90.0	89.3	87.1	85.5	82.0	76.5	75.1	79.7	80.5	82.5	84.1	86.0	82.6	78.6	73.9	86.2	133.6
10000	89.3	90.7	90.5	88.3	87.4	84.6	78.6	77.0	80.8	81.3	82.8	82.4	83.7	80.6	77.6	72.4	87.8	135.2
12500	87.0	87.6	87.5	86.2	85.7	82.9	78.4	78.8	83.0	85.6	86.7	85.8	87.1	83.7	80.9	73.3	89.4	136.8
16000	82.7	83.9	84.0	82.3	82.1	78.4	73.0	75.3	79.3	82.0	83.3	83.6	84.9	81.5	79.0	72.0	88.0	135.4
20000	78.0	78.9	78.9	77.6	76.0	72.0	67.5	69.7	74.8	77.6	78.8	78.8	79.5	76.6	73.7	66.8	85.7	133.1
OVERALL	98.9	99.1	98.2	96.0	94.8	92.0	89.1	89.2	91.5	93.1	94.4	94.7	95.9	94.6	92.8	91.0	96.8	144.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	69.2	80.3	83.4	84.8	85.3	84.6	83.8	83.6	85.1	86.4	87.0	86.9	86.7	84.0	77.6	70.8		

TABLE VIII. - Continued. NOISE OF QF-3 CONFIGURATION 35 - SUPPRESSOR B,

FIRST TWO INLET SECTIONS ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15^{o} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2810 rpm; fundamental blade passage frequency, 2482 hertz

FREQUENCY	ANGLE, DEG															AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	82.2	78.9	81.9	82.0	79.5	77.5	79.0	77.0	78.2	77.4	79.0	77.1	79.5	81.0	82.5	84.4	79.7	127.1
63	72.3	72.9	72.6	72.6	72.6	73.6	74.4	75.8	75.6	75.9	76.8	73.7	79.6	81.8	83.3	85.0	77.6	125.0
80	74.4	73.1	72.9	72.1	72.1	73.8	74.1	75.3	76.6	76.6	78.9	78.3	82.8	84.3	86.8	87.1	79.8	127.2
100	79.4	77.4	77.9	75.9	74.2	75.4	76.0	77.4	79.0	80.2	82.0	79.5	85.2	87.2	87.7	87.9	81.9	129.3
125	76.5	74.2	75.4	76.2	76.2	77.7	78.9	80.5	81.7	82.5	83.2	81.4	85.7	87.0	87.9	86.9	82.6	130.0
160	76.9	76.1	77.4	77.7	78.9	80.1	80.2	82.1	82.6	82.2	82.6	80.8	83.4	84.9	85.1	83.1	81.8	129.2
200	76.7	77.0	77.2	77.7	77.7	78.5	78.9	79.9	80.5	79.2	80.0	79.1	82.9	83.5	84.4	81.8	80.3	127.7
250	78.1	78.6	76.9	76.4	76.9	77.1	78.6	79.2	81.1	81.7	82.6	81.0	84.6	85.1	85.1	82.1	81.3	128.7
315	78.3	78.3	77.4	77.6	78.4	78.6	79.6	80.6	81.4	81.8	82.4	80.7	83.6	84.3	83.9	81.0	81.2	128.6
400	80.0	78.7	77.5	77.0	77.2	78.3	79.0	79.8	81.3	82.2	83.2	81.8	84.2	83.8	82.8	80.6	81.3	128.7
500	81.9	80.2	78.4	77.7	77.4	78.5	79.0	80.2	81.9	83.4	83.9	82.3	84.4	83.4	82.4	79.3	81.7	129.1
630	82.9	80.7	78.7	77.9	77.7	78.9	78.7	80.4	81.9	83.2	84.9	83.0	85.2	83.9	81.7	79.0	82.1	129.5
800	83.4	81.0	79.5	78.5	78.2	78.4	78.9	80.0	81.7	83.0	84.5	83.4	86.5	84.4	81.5	78.6	82.3	129.7
1000	85.9	82.6	80.9	79.2	78.7	78.6	79.6	80.4	82.4	83.7	84.2	83.5	86.2	84.7	81.1	78.3	82.6	130.0
1250	85.3	82.3	80.3	79.3	78.8	78.3	79.0	80.0	82.0	84.0	85.0	83.9	84.8	84.2	80.3	77.2	82.5	129.9
1600	84.6	82.6	80.9	79.9	78.7	77.4	77.9	78.7	81.2	83.2	83.9	83.3	84.7	82.6	79.2	76.3	81.8	129.2
2000	89.4	85.6	83.6	81.4	79.4	78.9	77.9	79.6	80.9	82.9	83.9	83.7	84.1	82.2	78.9	76.0	82.5	129.9
2500	90.7	91.5	90.0	87.0	83.7	82.0	78.7	79.0	80.5	81.7	83.2	83.4	87.5	83.2	79.5	76.9	85.0	132.4
3150	87.6	85.8	83.8	81.5	80.1	77.3	75.8	76.1	78.3	79.5	80.8	82.6	82.8	80.3	77.6	74.2	81.3	128.7
4000	90.9	88.7	86.5	84.5	82.2	79.5	76.5	75.8	78.3	79.5	80.7	82.8	82.3	80.3	77.7	74.3	82.9	130.3
5000	92.0	91.2	89.6	88.1	86.6	83.7	79.7	76.5	79.0	79.7	80.4	83.0	83.6	81.5	77.7	75.1	85.4	132.8
6300	90.8	91.2	89.8	87.5	86.8	83.5	78.0	77.0	79.2	80.0	82.5	84.5	84.7	79.5	79.2	75.1	86.0	133.4
8000	91.7	92.7	91.5	90.0	88.7	86.4	80.7	78.7	82.1	83.0	85.5	86.7	88.9	84.2	81.4	77.2	89.1	136.5
10000	90.7	91.9	91.1	89.1	88.0	86.3	80.5	78.5	81.5	81.3	83.2	85.8	84.2	80.7	78.7	73.9	88.8	136.2
12500	89.6	90.7	89.9	88.8	88.6	86.8	82.3	80.2	84.3	86.0	87.6	87.8	86.9	83.4	81.1	74.3	91.2	138.6
16000	83.6	85.6	85.1	83.8	83.4	81.6	77.1	78.9	82.6	84.6	86.1	87.8	86.8	83.1	80.8	74.1	90.5	137.9
20000	78.5	80.0	79.7	79.1	77.7	75.7	72.3	74.1	79.7	80.8	82.5	87.6	81.9	79.0	76.4	69.6	90.0	137.4
OVERALL	101.1	100.8	99.6	97.9	96.8	95.2	93.0	93.3	95.3	96.3	97.6	97.9	99.1	97.9	97.1	95.7	99.5	146.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	71.6	82.2	86.2	87.4	87.7	87.9	86.9	87.8	89.7	90.6	91.4	90.4	91.7	87.3	81.9	74.5		

TABLE VIII. - Concluded. NOISE OF QF-3 CONFIGURATION 35 - SUPPRESSOR B,

FIRST TWO INLET SECTIONS ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15^{0} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3161 rpm; fundamental blade passage frequency, 2792 hertz

FREQUENCY	ANGLE, DEG															AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	81.5	79.5	83.3	80.6	81.0	79.3	75.6	79.6	80.0	81.1	83.0	82.7	83.3	85.5	87.0	88.7	82.6	130.0
63	74.7	77.4	76.7	75.4	76.5	76.2	76.5	77.0	77.2	78.9	80.0	79.1	84.0	85.9	88.2	89.3	81.5	128.9
80	76.8	76.3	75.1	74.5	75.0	75.5	75.8	76.3	78.0	80.1	82.5	83.2	87.6	89.1	91.3	92.5	84.2	131.6
100	86.3	82.3	81.0	79.5	77.8	79.6	80.6	81.6	82.8	84.0	86.6	85.2	90.0	91.5	93.0	93.2	86.6	134.0
125	81.0	78.8	79.0	79.0	80.5	81.3	82.1	83.6	84.6	86.5	88.0	87.2	89.8	91.3	92.5	90.7	86.8	134.2
160	80.4	79.8	81.4	81.3	82.6	83.3	83.4	84.4	85.4	85.6	86.6	85.7	88.3	88.9	89.9	87.7	85.7	133.1
200	80.1	81.0	80.5	80.8	80.8	81.1	81.8	82.1	82.1	82.8	84.1	84.2	87.6	88.8	89.8	86.7	84.4	131.8
250	80.1	80.6	80.1	80.1	80.3	80.1	80.9	82.4	83.8	85.1	86.8	86.4	89.1	89.8	89.9	87.0	85.4	132.8
315	84.3	82.3	80.9	81.4	82.3	82.6	82.9	84.1	84.4	85.4	86.6	86.4	88.1	88.8	88.9	85.5	85.4	132.8
400	81.5	80.7	80.5	80.7	80.7	81.3	82.0	83.0	84.3	86.0	87.0	86.6	88.7	88.7	88.0	84.6	85.3	132.7
500	83.4	82.1	80.7	81.2	81.4	82.1	83.1	84.1	85.4	86.4	87.6	87.0	88.4	87.6	87.1	83.8	85.5	132.9
630	85.5	83.0	81.7	81.4	81.0	81.9	82.9	83.9	85.7	87.2	88.7	88.0	89.2	87.9	86.0	83.1	86.0	133.4
800	86.3	83.6	82.1	82.1	81.8	81.9	82.9	84.3	85.8	87.3	88.4	88.3	89.8	88.3	85.9	82.6	86.2	133.6
1000	89.2	85.7	84.8	82.5	82.7	82.8	83.5	84.3	86.5	88.2	88.5	88.3	90.0	87.7	85.3	82.4	86.6	134.0
1250	88.0	86.0	84.4	82.9	82.2	82.4	83.5	84.2	86.5	87.9	88.4	88.3	89.2	87.0	84.2	81.1	86.4	133.8
1600	87.3	85.4	83.8	82.3	81.4	81.6	82.1	83.9	86.3	87.4	87.9	88.0	88.6	85.4	83.1	80.0	85.8	133.2
2000	88.1	86.1	84.1	82.9	81.9	81.6	81.9	83.4	85.7	86.4	88.1	87.5	88.1	85.2	82.4	79.3	85.6	133.0
2500	91.1	91.1	90.3	87.9	85.7	85.7	83.1	82.9	84.2	85.4	87.2	88.2	88.6	85.1	82.7	79.8	87.0	134.4
3150	91.2	90.9	89.9	87.9	85.6	85.6	82.6	82.1	83.4	84.4	86.4	87.7	88.6	85.9	83.4	79.5	86.9	134.3
4000	91.1	89.6	87.9	86.1	83.2	82.4	80.2	80.4	82.4	83.6	85.1	86.3	86.4	83.4	81.2	77.1	85.4	132.8
5000	92.9	91.5	90.3	88.1	85.8	84.3	81.4	79.4	82.3	82.6	83.8	85.7	84.9	83.4	79.8	76.5	86.5	133.9
6300	91.9	92.2	91.1	88.7	87.9	85.9	80.9	80.6	82.2	82.7	85.1	87.6	86.4	82.4	81.9	77.2	87.8	135.2
8000	91.6	92.8	91.7	89.7	87.7	86.4	81.9	81.2	85.4	85.5	88.5	89.3	89.5	85.5	82.7	78.3	89.9	137.3
10000	90.2	91.5	90.5	88.5	87.3	86.1	81.3	80.8	83.6	83.1	85.5	86.7	85.5	82.5	80.7	75.5	89.1	136.5
12500	90.3	91.8	91.0	90.2	89.3	88.0	84.2	82.4	85.6	86.6	88.0	88.7	86.8	83.6	81.6	75.3	92.1	139.5
16000	84.2	86.4	85.9	84.7	83.9	83.4	79.8	81.1	84.3	85.7	87.2	88.8	86.8	83.2	81.3	75.0	91.5	138.9
20000	78.6	80.4	80.2	79.8	78.2	77.6	76.4	78.6	82.5	83.5	84.8	87.7	83.2	80.6	78.2	71.8	91.4	138.8
OVERALL	102.2	101.8	100.8	99.2	98.0	97.5	96.1	96.7	98.5	99.6	101.1	101.4	102.3	101.6	101.5	100.2	101.6	149.0
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	73.1	83.3	87.7	89.3	90.1	91.5	90.8	91.7	93.5	94.4	95.5	95.0	94.7	90.8	86.2	78.5		

TABLE IX. - NOISE OF QF-3 CONFIGURATION 36 - SUPPRESSOR A, FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2110 rpm; fundamental blade passage frequency, 1863 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	68.4	65.9	67.1	65.5	65.6	66.4	66.7	67.4	67.4	68.6	69.2	69.8	71.1	72.2	73.2	73.5	69.1	116.5
63	71.6	68.3	65.9	66.3	65.8	68.3	68.9	68.8	66.1	68.9	67.9	67.9	71.1	71.6	73.6	73.1	69.2	116.6
80	73.1	69.1	66.5	67.6	65.3	68.8	69.5	70.0	67.3	69.1	69.8	70.7	73.3	74.6	75.8	75.3	70.9	118.3
100	68.9	67.3	66.4	66.4	66.5	67.6	67.3	68.8	70.8	71.8	72.6	73.5	75.3	75.6	76.8	77.0	72.1	119.5
125	70.8	69.5	69.0	69.6	69.1	70.1	70.5	71.3	72.5	73.3	73.8	74.4	75.6	75.6	77.3	75.7	73.1	120.5
160	71.3	70.3	69.6	70.0	70.6	71.1	71.5	72.0	72.1	72.8	73.1	73.1	74.1	74.3	74.6	72.5	72.4	119.8
200	75.0	74.8	69.8	71.1	72.3	71.0	69.6	69.6	71.5	70.6	71.6	71.6	73.6	74.3	73.6	72.4	71.9	119.3
250	72.6	71.9	70.2	69.1	69.1	69.1	69.4	69.9	71.7	73.2	74.1	74.8	75.2	75.7	74.4	72.0	72.6	120.0
315	75.4	73.1	71.2	70.6	70.6	70.7	71.1	71.4	72.4	73.2	74.1	74.2	75.1	74.2	73.6	71.3	72.8	120.2
400	77.4	74.1	71.4	70.4	70.1	70.4	70.2	71.4	72.9	74.2	75.6	75.6	76.1	75.6	73.2	70.3	73.6	121.0
500	76.9	74.5	72.2	71.4	70.5	70.5	71.4	72.0	73.7	74.4	75.9	76.0	76.5	75.7	73.5	69.4	74.0	121.4
630	76.4	74.9	71.7	71.0	70.5	70.5	70.9	72.2	73.9	75.5	77.0	77.1	78.1	77.6	73.5	69.4	74.8	122.2
800	78.7	75.9	73.6	71.9	70.7	70.6	71.1	71.9	74.1	75.4	76.9	77.7	79.2	79.1	73.6	70.0	75.4	122.8
1000	78.5	75.4	73.1	70.9	70.5	70.3	70.8	71.4	73.6	75.4	76.1	76.2	78.6	79.1	73.3	70.0	74.9	122.3
1250	76.6	73.4	71.4	70.1	69.6	68.9	69.4	70.6	72.2	74.6	75.9	76.3	76.6	77.6	72.6	68.0	73.9	121.3
1600	78.9	77.4	75.7	72.9	71.7	69.4	68.6	69.4	71.1	73.1	75.1	74.3	75.6	75.1	70.9	67.8	73.5	120.9
2000	82.4	83.5	82.2	77.0	77.7	72.0	69.5	70.4	71.9	72.5	74.5	74.6	76.5	77.4	72.7	70.8	76.5	123.9
2500	76.3	75.6	73.6	70.6	68.5	67.1	65.8	66.9	69.1	70.4	72.1	72.0	73.1	72.9	68.1	64.8	71.3	118.7
3150	80.5	80.2	77.5	74.2	72.2	69.2	66.3	66.8	69.0	70.4	72.0	72.3	73.5	73.0	69.0	65.8	73.4	120.8
4000	86.1	85.7	83.7	80.5	77.2	73.2	69.7	68.7	71.1	71.7	73.1	73.5	76.1	76.1	72.6	69.0	78.1	125.5
5000	85.1	84.6	82.6	79.4	77.2	72.5	69.6	67.4	71.1	71.7	73.6	73.9	76.6	76.4	72.6	67.3	77.7	125.1
6300	86.1	86.0	85.5	82.5	81.3	76.8	70.5	70.3	73.8	74.4	76.5	80.0	82.0	78.3	74.5	70.4	81.2	128.6
8000	86.1	87.5	86.7	84.0	82.5	78.7	73.0	73.0	79.4	82.9	80.9	82.8	84.7	82.2	78.2	72.0	84.4	131.8
10000	84.9	85.9	85.9	83.6	83.3	80.4	73.7	75.4	81.6	81.3	83.1	83.6	84.9	81.6	78.6	71.9	85.5	132.9
12500	82.8	83.1	83.3	82.0	81.2	78.5	73.0	74.5	81.3	82.6	85.2	84.4	86.1	83.6	81.1	72.5	86.9	134.3
16000	78.3	79.7	79.5	77.5	76.8	73.4	66.9	69.9	74.8	77.1	79.3	79.2	81.3	78.1	75.4	68.5	83.6	131.0
20000	73.6	74.7	74.0	72.5	70.3	66.8	61.0	63.3	69.7	71.7	73.0	74.2	75.5	72.3	69.7	62.4	80.7	128.1
OVERALL	94.9	94.8	93.8	91.3	90.2	87.5	84.4	85.1	88.7	90.0	91.3	91.7	93.3	91.8	89.2	85.9	93.3	140.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
122.5 METERS	64.8	75.0	78.7	79.8	80.3	79.0	77.8	78.5	80.8	81.7	82.6	82.0	82.2	80.0	73.3	65.7		

TABLE IX. - Continued. NOISE OF QF-3 CONFIGURATION 36 - SUPPRESSOR A, FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15^{0} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2461 rpm; fundamental blade passage frequency, 2173 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	72.5	69.5	71.0	70.6	71.2	71.5	71.2	72.2	73.7	74.7	75.7	74.8	76.7	76.3	79.0	79.4	74.5	121.9
63	68.8	70.3	69.8	69.3	69.0	69.3	71.0	70.3	71.8	72.8	73.8	73.6	76.1	77.8	78.5	79.5	73.7	121.1
80	75.3	73.1	76.5	70.0	71.0	70.8	69.3	71.1	74.5	76.8	76.3	76.5	79.0	80.0	82.1	81.7	76.4	123.8
100	71.8	70.3	70.2	69.5	69.8	70.5	71.5	73.7	78.3	80.5	79.8	78.6	81.2	82.0	83.0	82.1	78.3	125.7
125	72.8	71.8	72.4	72.6	73.3	73.4	75.4	77.3	80.1	81.6	81.6	79.9	81.6	82.3	83.1	81.0	79.4	126.8
160	74.1	73.5	74.0	73.8	74.8	75.5	76.0	77.0	78.0	79.8	79.8	78.7	80.0	80.3	80.0	78.5	78.0	125.4
200	74.0	74.0	73.5	73.2	73.5	73.3	73.5	74.3	76.7	77.2	76.7	76.3	78.7	79.3	79.2	77.2	76.2	123.6
250	76.7	75.8	75.2	74.5	75.0	73.0	74.3	76.0	78.8	79.8	80.0	79.8	80.7	80.7	80.2	77.2	78.2	125.6
315	75.8	74.8	74.8	74.5	74.5	74.8	75.3	77.0	78.5	78.5	79.1	78.9	79.1	79.5	79.0	75.7	77.5	124.9
400	78.0	76.4	75.4	74.0	73.4	73.9	74.5	76.4	78.4	79.7	79.7	80.1	80.5	80.4	78.4	75.3	78.1	125.5
500	79.4	77.1	75.3	74.8	74.8	74.4	75.8	76.8	78.9	79.9	80.1	80.4	80.8	80.1	77.9	74.6	78.4	125.8
630	79.1	77.2	75.4	75.1	74.1	74.6	75.2	76.9	78.4	80.1	80.9	81.0	81.6	80.9	77.4	74.0	78.7	126.1
800	81.1	78.6	76.3	75.1	74.1	74.6	75.3	76.6	78.3	79.5	81.1	81.7	82.6	82.8	77.6	73.8	79.2	126.6
1000	82.8	80.3	77.5	75.6	74.6	74.6	75.3	76.6	78.5	80.0	80.5	80.6	82.3	83.1	77.3	73.9	79.2	126.6
1250	80.1	77.4	75.8	74.4	73.6	73.4	74.1	75.3	77.4	79.3	80.1	80.4	81.1	81.4	76.3	72.2	78.2	125.6
1600	79.9	77.7	76.2	74.9	73.7	72.5	72.7	74.0	76.2	78.2	79.4	79.1	80.0	79.4	75.0	71.4	77.2	124.6
2000	84.7	83.7	81.0	79.8	76.6	76.6	73.5	74.3	76.3	77.5	79.5	79.6	82.1	81.3	75.5	72.7	79.2	126.6
2500	81.6	80.6	77.9	76.4	73.8	72.9	71.1	72.3	74.4	75.6	77.4	77.9	79.3	78.3	73.8	70.2	76.7	124.1
3150	83.1	82.2	79.2	76.6	74.4	72.2	70.6	71.7	73.9	75.2	76.4	77.3	77.9	76.6	73.1	69.3	76.7	124.1
4000	86.6	87.7	84.9	81.9	78.6	75.7	72.9	72.0	74.6	75.7	76.6	78.0	79.4	78.9	75.2	71.5	80.3	127.7
5000	88.1	87.0	84.5	82.3	79.5	76.0	73.0	71.5	74.5	75.1	76.5	77.1	79.0	78.3	75.1	70.4	80.3	127.7
6300	89.1	89.7	88.7	85.5	85.4	80.9	74.6	74.4	76.4	77.1	79.3	82.1	83.9	79.1	76.1	73.2	84.3	131.7
8000	88.5	89.8	88.0	86.0	84.0	80.5	75.0	74.8	79.4	80.0	81.7	84.3	86.2	82.5	78.8	73.6	85.6	133.0
10000	88.7	90.2	89.4	87.5	86.1	83.5	77.0	76.8	81.0	80.7	82.4	82.5	83.6	80.5	77.5	72.4	87.1	134.5
12500	88.5	87.0	86.7	85.6	85.1	82.4	77.5	79.0	83.8	84.7	87.1	86.0	87.1	83.4	81.4	73.4	89.2	136.6
16000	82.3	83.9	83.4	81.8	81.3	78.5	72.8	75.5	79.7	81.3	83.9	83.9	84.9	80.9	78.9	71.8	87.9	135.3
20000	77.3	78.6	76.4	77.0	75.5	71.7	67.7	70.1	75.0	76.8	78.0	78.9	79.4	75.9	73.6	66.7	85.3	132.7
OVERALL	97.7	97.8	96.4	94.5	93.3	90.9	86.5	89.5	92.3	93.5	94.6	94.8	96.1	94.8	93.0	90.6	96.3	143.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	87.1	76.7	80.7	82.2	82.7	82.4	81.6	82.9	85.4	86.4	87.1	86.5	86.8	84.0	77.3	69.5		

TABLE IX. - Continued. NOISE OF QF-3 CONFIGURATION 36 - SUPPRESSOR A, FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2810 rpm; fundamental blade passage frequency, 2482 hertz

FREQUENCY	ANGLE, DEG															AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	75.4	78.7	75.2	76.5	76.6	74.5	77.4	74.9	77.7	77.2	79.4	81.0	80.6	81.4	83.9	83.8	79.3	126.7
63	71.2	73.4	72.7	72.6	71.7	72.2	72.6	73.1	74.2	75.1	76.9	76.6	80.4	82.1	83.6	83.8	77.4	124.8
80	74.2	73.8	72.3	72.2	71.7	71.0	71.7	73.5	74.7	76.5	78.3	79.3	83.0	85.2	86.7	87.2	79.8	127.2
100	75.1	77.6	77.8	76.3	73.3	74.3	75.3	77.3	78.8	80.4	82.3	82.2	85.4	87.3	88.4	88.0	82.2	129.6
125	76.9	74.2	75.0	75.4	76.4	77.2	77.9	79.4	80.5	82.0	83.7	84.1	86.2	87.0	88.0	86.4	82.7	130.1
160	76.6	76.6	77.4	77.8	77.9	76.8	75.8	80.4	81.4	82.3	82.6	83.2	83.8	85.3	85.6	83.0	81.8	129.2
200	78.5	77.0	77.0	77.4	77.2	76.9	77.2	77.2	78.7	78.7	80.0	80.5	82.7	84.0	85.0	82.1	80.0	127.4
250	78.4	78.8	76.9	76.4	76.8	76.3	76.6	77.8	79.6	81.4	82.4	82.7	84.8	85.1	85.4	82.1	81.2	128.6
315	78.6	77.8	77.4	77.1	78.1	77.9	79.3	79.8	80.9	81.8	82.6	82.7	83.9	84.6	83.9	80.8	81.3	128.7
400	80.2	77.8	77.2	76.5	76.7	77.3	77.8	79.0	81.0	82.2	83.5	83.8	84.7	84.2	83.3	79.9	81.5	128.9
500	81.7	80.0	77.9	77.9	77.5	78.2	79.2	80.2	81.5	83.0	83.9	84.6	84.7	84.0	82.7	78.8	82.0	129.4
630	82.6	79.9	78.2	77.7	77.4	78.2	78.6	80.1	81.7	83.2	84.7	85.0	85.1	84.2	81.9	78.1	82.2	129.6
800	82.5	80.0	78.7	77.9	77.7	78.0	78.9	79.9	81.9	83.0	84.4	85.3	86.4	85.2	81.7	77.9	82.5	129.9
1000	84.9	81.8	79.9	78.8	77.9	77.9	79.1	79.9	82.3	84.1	84.1	85.5	86.4	85.3	81.3	77.7	82.8	130.2
1250	83.8	80.5	79.1	78.0	77.5	77.6	78.8	80.0	82.0	84.0	84.8	85.9	85.1	84.6	80.6	76.7	82.6	130.0
1600	82.2	79.7	78.3	77.2	76.7	76.7	77.3	78.5	81.2	83.2	84.0	85.1	84.8	82.8	79.3	75.7	81.7	129.1
2000	84.8	81.8	79.3	77.2	76.7	76.3	76.3	78.0	80.5	82.0	83.7	84.8	84.0	82.2	79.0	75.1	81.4	128.8
2500	85.4	85.9	85.2	80.9	78.2	77.1	76.2	77.2	79.7	80.9	83.1	84.3	86.4	84.1	79.6	76.1	82.5	129.9
3150	84.9	83.3	80.9	77.9	76.8	74.9	74.1	75.6	78.1	79.4	81.1	82.0	82.6	80.3	76.9	73.5	80.1	127.5
4000	88.7	87.0	84.5	81.4	79.0	76.3	74.8	75.3	78.2	79.2	80.7	82.9	82.2	80.7	77.5	73.7	81.6	129.0
5000	89.9	89.7	87.7	85.5	82.5	79.2	77.0	75.0	78.5	79.5	80.9	83.1	83.5	82.0	79.0	74.0	83.8	131.2
6300	89.4	90.1	88.5	85.7	84.6	80.9	75.9	76.1	78.9	80.1	81.4	84.1	85.1	79.7	77.4	74.0	84.9	132.3
8000	90.6	91.9	90.4	88.4	86.3	82.9	78.9	77.6	82.3	83.3	84.8	86.9	88.7	84.4	81.9	76.4	88.1	135.5
10000	89.9	90.9	89.9	87.7	86.6	84.1	79.0	78.0	81.3	81.3	82.5	85.3	84.0	80.9	78.9	73.5	87.8	135.2
12500	89.1	90.0	89.5	87.8	87.5	85.0	81.2	80.1	84.6	85.8	88.0	90.1	86.8	83.1	81.6	74.0	91.1	138.5
16000	83.3	84.9	84.9	83.3	83.1	80.3	77.0	78.9	82.6	84.3	86.6	88.9	86.8	82.8	80.8	73.8	90.6	138.0
20000	78.2	79.3	79.5	78.4	77.2	74.2	72.4	74.4	79.5	81.5	81.8	86.8	82.3	79.0	77.0	69.7	89.6	137.0
OVERALL	99.3	99.3	98.1	98.1	95.0	93.1	91.9	92.5	94.9	96.2	97.6	99.1	99.2	98.2	97.4	95.4	99.0	146.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	68.7	78.8	83.1	83.9	84.6	84.9	85.3	86.6	89.2	90.3	91.3	91.6	91.3	87.8	82.1	73.9		

TABLE IX. - Concluded. NOISE OF QF-3 CONFIGURATION 36 - SUPPRESSOR A, FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3161 rpm; fundamental blade passage frequency, 2792 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	81.9	76.9	81.3	78.6	79.6	78.1	79.1	80.3	80.3	81.8	82.9	83.4	83.9	85.9	87.4	88.3	82.6	130.0
63	75.2	76.9	76.7	75.9	75.9	76.7	76.6	77.6	77.9	79.2	80.4	82.0	84.4	87.1	88.6	88.8	82.0	129.4
80	76.6	75.9	75.1	74.6	74.6	75.1	75.3	76.1	78.4	80.1	82.8	84.8	87.3	90.1	91.3	92.3	84.4	131.8
100	85.6	80.8	80.9	78.9	78.8	79.1	80.4	81.9	83.1	84.4	85.9	87.2	89.6	92.1	93.1	93.2	86.8	134.2
125	80.6	78.3	78.3	78.3	80.9	81.6	81.8	83.6	85.1	86.3	87.4	88.7	89.9	92.1	93.3	91.1	87.2	134.6
160	80.1	80.1	81.3	81.6	82.5	83.3	83.8	84.1	84.8	86.1	86.3	87.4	88.0	90.0	90.5	88.0	86.0	133.4
200	80.3	80.7	80.3	80.3	80.8	81.0	81.3	81.5	82.2	82.7	83.7	85.4	87.7	88.8	89.8	86.7	84.4	131.8
250	80.3	80.1	80.8	79.8	79.9	80.8	81.4	82.8	84.1	85.8	86.8	87.7	88.8	90.3	89.9	87.0	85.7	133.1
315	84.5	82.1	81.0	80.8	82.0	82.6	82.6	83.6	84.6	86.0	86.5	87.4	88.1	89.5	89.0	85.5	85.6	133.0
400	81.4	79.9	80.3	80.3	80.3	81.4	81.9	83.1	84.8	86.4	87.4	88.2	88.9	89.1	88.1	84.6	85.7	133.1
500	82.4	81.0	80.5	81.0	81.0	82.2	83.2	83.7	85.7	86.5	87.5	88.0	88.7	88.0	87.4	83.2	85.7	133.1
630	85.2	82.4	81.1	80.7	80.7	82.1	83.1	83.9	86.2	87.4	88.4	88.8	89.4	88.2	86.6	82.5	86.2	133.6
800	85.6	82.9	81.9	81.4	81.1	81.9	83.4	84.1	85.7	87.2	88.4	89.3	90.1	88.6	86.2	82.6	86.4	133.8
1000	88.8	84.6	84.1	82.0	81.8	83.0	83.6	84.5	86.5	88.1	88.5	89.1	90.3	88.1	85.3	82.2	86.7	134.1
1250	87.2	83.7	82.9	81.7	81.5	81.7	83.0	84.4	86.7	88.0	88.5	89.0	89.2	87.4	84.9	81.1	86.4	133.8
1600	85.2	82.7	81.6	80.6	80.7	81.1	82.2	83.6	86.1	87.6	88.1	88.3	88.7	85.9	83.7	80.1	85.7	133.1
2000	85.3	82.8	81.1	80.3	79.9	80.9	81.1	83.1	85.1	86.8	88.3	88.0	88.6	85.4	82.8	79.2	85.4	132.8
2500	87.7	88.2	85.6	84.7	82.2	80.7	80.2	81.9	83.9	85.7	87.2	88.5	88.7	85.4	82.1	78.8	85.7	133.1
3150	87.9	88.2	85.6	84.7	82.1	80.7	79.2	80.9	83.1	84.4	85.4	87.5	88.6	85.9	82.2	78.3	85.3	132.7
4000	88.9	86.9	85.5	83.0	81.2	79.9	79.0	79.5	82.2	83.2	84.5	85.3	86.5	83.8	81.2	76.8	84.2	131.6
5000	91.2	90.1	87.9	85.2	83.6	80.7	78.9	78.5	81.5	82.5	84.0	84.5	85.0	83.0	80.5	76.0	85.0	132.4
6300	90.2	90.5	89.3	86.9	85.7	83.4	79.0	80.0	81.9	82.5	84.3	86.5	86.4	82.2	80.0	76.5	86.4	133.8
8000	90.1	91.3	90.3	87.8	86.1	84.1	80.1	80.8	85.0	85.6	87.1	89.1	89.8	85.6	82.6	78.1	89.0	136.4
10000	89.4	90.3	89.2	87.2	86.2	84.4	80.3	79.9	83.1	83.4	84.2	84.8	85.6	82.6	80.6	75.5	88.1	135.5
12500	90.7	91.1	91.1	89.7	89.1	86.9	83.2	81.9	85.0	85.9	88.1	87.3	87.4	83.8	82.0	75.2	91.7	139.1
16000	83.5	85.8	85.8	84.1	84.0	82.7	79.1	81.0	83.7	85.4	87.5	87.7	87.3	83.2	81.0	75.4	91.2	138.6
20000	78.6	79.7	80.2	79.5	78.1	77.1	76.2	77.9	82.2	83.5	83.5	84.6	83.5	80.4	78.4	71.8	90.4	137.8
OVERALL	100.8	100.2	99.2	97.6	96.9	96.2	95.6	96.5	98.5	99.8	100.8	101.7	102.5	102.1	101.8	100.1	101.2	148.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	71.2	81.1	84.8	87.0	88.0	88.8	89.3	91.1	93.3	94.6	95.3	95.4	94.7	91.0	86.0	78.3		

TABLE X. - NOISE OF QF-3 CONFIGURATION 38 - SUPPRESSOR A, FIRST INLET SECTION ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2108 rpm; fundamental blade passage frequency, 1862 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	68.5	65.7	67.0	65.8	60.2	65.7	66.5	67.2	67.8	68.2	68.3	69.9	70.2	71.8	72.8	73.4	68.8	116.2
63	71.9	68.9	65.7	67.1	65.6	67.9	69.1	70.4	67.2	68.6	68.2	69.2	69.9	71.2	73.6	73.6	69.4	116.8
80	73.2	69.1	66.6	67.4	65.4	67.9	69.1	70.2	67.9	70.1	70.1	71.0	73.2	74.2	75.9	75.3	70.9	118.3
100	69.3	68.0	67.0	67.0	68.0	67.2	67.7	69.0	70.3	71.0	72.7	73.8	75.3	75.8	77.3	77.6	72.3	119.7
125	71.4	70.2	69.2	70.1	69.7	69.6	71.6	70.9	72.4	72.9	74.1	75.2	75.4	75.7	76.9	76.0	73.2	120.6
160	71.7	71.1	70.4	70.4	71.1	71.1	71.7	71.6	72.1	72.4	73.4	73.3	73.6	73.4	74.1	72.3	72.3	119.7
200	75.6	75.1	71.4	71.9	72.6	70.9	69.8	69.3	71.8	70.9	71.4	71.8	73.1	73.8	73.9	72.1	72.0	119.4
250	73.8	73.1	72.1	71.4	70.9	69.8	69.6	71.6	72.3	73.4	74.9	75.5	75.3	75.4	74.6	72.0	73.2	120.6
315	76.7	75.2	73.4	72.4	72.2	71.2	71.2	72.0	72.9	73.7	74.4	74.8	74.7	74.7	73.7	70.9	73.4	120.8
400	78.8	76.8	73.8	72.7	73.2	70.8	70.7	71.7	73.2	74.5	75.7	76.4	76.7	76.8	74.2	71.0	74.5	121.9
500	77.2	76.7	74.5	74.2	73.2	71.0	71.7	72.5	73.7	75.0	76.0	76.6	76.2	76.2	73.5	70.2	74.6	122.0
630	78.0	77.0	75.4	74.5	73.5	71.5	71.2	72.9	74.0	75.5	76.9	77.5	77.5	77.4	73.5	69.8	75.3	122.7
800	79.6	78.4	76.7	75.7	74.2	72.1	71.7	72.4	73.9	75.6	77.1	78.2	79.1	79.2	73.7	70.6	76.1	123.5
1000	79.5	78.4	77.0	75.7	74.0	71.9	71.5	71.9	73.5	75.4	75.9	76.6	78.2	78.9	73.9	70.1	75.6	123.0
1250	79.0	78.6	77.1	75.5	74.1	71.5	70.8	70.8	72.5	74.3	75.6	76.2	76.6	77.3	72.8	68.7	75.0	122.4
1600	83.4	82.0	81.2	79.9	79.2	76.0	71.7	70.9	72.0	73.5	75.2	74.6	75.7	75.7	72.4	69.1	76.7	124.1
2000	89.5	89.4	87.4	86.4	86.2	83.0	76.5	74.4	74.5	75.2	76.2	76.1	78.4	79.2	75.0	73.3	82.4	129.8
2500	83.0	83.5	81.7	79.7	77.7	74.2	70.5	70.2	71.0	71.5	73.0	72.8	73.9	73.5	70.0	67.6	76.3	123.7
3150	85.0	85.1	84.0	81.5	79.8	76.0	71.8	70.0	70.8	72.0	72.3	73.2	74.3	73.5	70.8	68.9	78.0	125.4
4000	89.2	89.0	88.4	86.5	83.4	79.9	75.2	72.2	72.9	73.5	74.2	74.3	76.5	76.5	74.0	71.6	82.1	129.5
5000	87.7	87.9	86.4	85.1	83.1	79.3	74.7	70.9	73.1	73.1	74.6	74.1	76.8	76.4	73.6	69.5	81.3	128.7
6300	88.2	89.1	88.8	86.6	85.5	82.6	75.1	73.1	75.1	75.5	76.8	79.8	82.1	78.1	75.3	72.1	84.0	131.4
8000	87.6	89.4	89.1	87.4	86.1	83.3	76.3	75.0	80.2	80.3	81.3	82.9	85.3	82.3	78.6	73.1	86.0	133.4
10000	87.7	89.1	89.2	87.8	88.4	86.0	78.6	77.6	82.8	82.1	83.8	84.0	85.1	81.9	79.0	73.3	88.0	135.4
12500	84.8	85.5	85.5	84.3	84.6	82.1	76.0	75.8	82.6	83.6	85.8	85.0	86.6	83.8	81.6	73.6	88.2	135.6
16000	78.7	80.2	79.3	77.1	77.1	73.5	67.4	71.0	76.0	78.0	80.0	80.1	81.5	78.3	76.3	69.4	84.1	131.5
20000	74.0	74.8	74.3	72.7	71.1	66.7	61.4	64.7	70.9	73.0	73.7	74.1	75.6	72.8	70.8	63.4	81.2	128.6
OVERALL	97.7	98.1	97.3	95.8	95.0	92.1	87.1	86.5	89.6	90.3	91.8	92.1	93.5	91.9	89.7	86.6	95.2	142.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	69.3	79.6	83.3	85.3	86.7	85.2	81.7	81.0	82.2	82.8	83.4	82.8	82.9	80.8	74.5	67.2		

TABLE X. - Continued. NOISE OF QF-3 CONFIGURATION 38 - SUPPRESSOR A, FIRST INLET SECTION ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2459 rpm; fundamental blade passage frequency, 2172 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	71.4	70.2	71.6	70.2	70.6	70.9	72.4	71.4	71.6	72.9	74.1	76.3	75.7	76.2	78.6	79.1	74.0	121.4
63	68.1	70.4	69.4	68.3	69.1	69.1	69.9	70.3	70.1	71.1	73.1	74.4	75.6	77.1	78.8	79.3	73.3	120.7
80	72.6	73.1	76.4	69.4	71.6	69.4	69.3	70.3	71.4	73.3	74.9	76.8	78.3	79.8	81.6	82.0	75.7	123.1
100	71.1	69.3	69.8	69.4	69.9	69.9	71.4	72.3	74.1	76.1	78.1	79.5	80.6	82.1	82.9	82.6	77.4	124.8
125	73.6	72.2	73.2	73.4	73.2	74.1	75.7	76.6	77.4	77.9	78.9	80.5	80.9	81.7	82.2	81.6	78.3	125.7
160	73.8	73.5	74.5	74.3	74.5	75.8	76.2	76.3	76.7	77.3	78.3	79.2	78.8	79.5	80.2	78.2	77.3	124.7
200	73.6	73.9	74.1	72.7	73.1	72.9	72.9	73.1	73.2	74.1	75.2	76.8	78.4	78.7	79.6	77.1	75.4	122.8
250	76.5	76.5	75.5	73.8	75.0	72.8	74.0	74.5	76.5	77.0	78.5	79.7	80.5	80.1	79.8	77.5	77.3	124.7
315	76.3	75.7	74.5	74.5	74.8	75.0	75.5	76.3	77.0	77.2	78.7	78.9	79.3	79.3	78.8	76.1	77.2	124.6
400	79.3	77.1	75.4	74.6	74.1	74.1	74.1	75.9	76.9	78.6	79.6	80.0	80.6	79.9	78.4	75.6	77.8	125.2
500	79.9	77.9	76.0	75.4	75.0	74.9	75.5	76.4	77.9	78.9	79.9	80.3	80.4	79.7	77.9	74.9	78.1	125.5
630	80.2	78.5	76.7	76.2	75.4	74.7	75.2	76.2	77.9	79.4	80.9	81.1	81.2	80.5	77.2	74.2	78.6	126.0
800	81.9	79.6	77.9	76.6	75.9	75.3	75.6	76.3	78.1	79.3	81.1	81.9	82.6	82.1	77.4	74.5	79.3	126.7
1000	83.2	80.4	78.2	77.1	76.6	75.4	75.9	76.2	78.1	79.7	80.2	80.5	82.4	82.2	77.4	74.0	79.2	126.6
1250	81.6	79.9	78.6	76.6	76.1	75.1	74.8	75.1	77.3	79.3	80.6	80.7	80.8	81.4	76.4	73.0	78.7	126.1
1600	82.7	81.3	80.3	78.7	77.3	75.2	74.0	74.2	76.3	78.3	79.7	79.4	80.0	79.5	75.2	72.1	78.3	125.7
2000	89.4	91.3	88.6	87.4	85.3	81.6	78.6	78.1	77.4	79.3	79.9	80.5	83.6	82.6	78.4	75.8	83.8	131.2
2500	86.6	87.8	85.8	84.1	82.3	78.3	75.8	75.3	76.1	76.9	78.1	78.4	80.1	79.6	75.6	72.7	80.9	128.3
3150	88.8	86.8	85.3	82.3	80.7	77.8	74.2	73.3	74.8	76.0	76.5	77.1	78.7	77.0	73.8	71.6	80.0	127.4
4000	91.6	91.8	90.3	88.5	85.3	82.5	78.1	75.3	76.4	76.8	77.6	78.2	80.6	79.6	76.4	74.0	84.5	131.9
5000	90.1	90.1	85.0	87.3	85.5	81.8	78.2	74.5	76.1	76.2	77.3	77.0	80.0	78.8	76.3	72.1	83.8	131.2
6300	90.9	92.3	92.3	89.6	90.3	86.4	79.8	77.1	77.6	78.3	79.9	81.6	84.1	79.4	76.9	74.6	87.3	134.7
8000	90.0	91.9	91.4	89.4	88.5	85.6	79.8	77.1	80.3	81.1	82.1	80.8	86.4	82.8	79.1	74.7	87.7	135.1
10000	89.2	90.5	90.3	88.8	88.2	85.8	79.9	78.0	81.1	81.3	82.3	82.9	84.3	80.9	78.1	73.0	88.1	135.5
12500	88.1	88.8	89.0	88.0	88.0	85.7	81.2	79.7	84.0	85.7	87.4	86.9	87.7	84.2	81.2	74.1	90.6	138.0
16000	82.2	83.9	83.4	81.9	81.7	78.8	74.0	76.4	79.9	82.4	84.4	85.0	85.7	81.9	79.2	72.7	88.5	135.9
20000	77.7	78.6	78.7	77.0	75.6	71.5	68.2	70.6	76.0	78.2	78.6	79.3	80.2	77.0	73.9	67.7	85.9	133.3
OVERALL	95.7	100.5	95.6	97.8	97.0	94.2	90.6	90.0	92.0	93.2	94.6	94.9	96.3	94.9	93.1	91.1	97.7	145.1
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	70.1	81.5	85.2	87.1	87.7	86.8	84.9	84.7	85.6	86.7	87.2	86.8	87.4	84.5	78.4	71.0		

TABLE X. - Continued. NOISE OF QF-3 CONFIGURATION 38 - SUPPRESSOR A, FIRST INLET SECTION ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2815 rpm; fundamental blade passage frequency, 2486 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	80.4	74.8	77.6	77.3	79.1	78.3	78.4	76.1	78.3	78.4	79.8	79.7	81.1	81.6	83.3	83.8	79.5	126.9
63	72.1	74.3	72.9	72.9	72.4	72.8	73.4	75.8	75.8	76.4	77.9	78.9	80.8	82.6	84.3	84.2	78.3	125.7
80	74.6	74.4	73.1	72.6	72.6	72.5	72.5	73.4	76.1	77.3	80.1	81.0	83.4	85.1	87.4	87.0	80.4	127.8
100	79.4	78.9	78.8	78.4	73.6	75.4	76.3	77.8	80.1	81.6	82.9	83.9	86.1	87.3	88.9	88.3	82.9	130.3
125	77.3	74.9	76.4	75.8	76.9	77.9	78.9	80.3	82.4	83.1	84.4	85.0	85.9	86.8	88.3	86.7	83.2	130.6
160	77.4	76.8	78.1	78.3	78.8	79.6	80.2	80.9	82.7	83.1	83.4	83.5	84.2	84.9	85.7	83.3	82.3	129.7
200	77.3	77.6	77.5	76.0	77.6	77.6	78.1	77.8	79.6	80.1	80.8	81.4	83.3	84.5	84.8	82.4	80.6	128.0
250	79.1	79.4	77.9	76.9	77.9	77.4	78.1	79.1	81.2	82.2	83.1	84.3	84.7	85.2	85.4	82.5	81.9	129.3
315	79.3	78.6	78.3	77.6	78.8	79.1	79.8	80.3	82.3	82.8	82.8	83.2	84.0	84.5	84.3	81.5	81.8	129.2
400	81.4	79.5	78.7	77.5	77.7	78.0	78.4	79.9	81.5	82.7	83.7	84.1	84.5	84.5	83.5	80.1	81.9	129.3
500	82.6	81.6	79.9	78.7	78.4	78.7	79.7	80.4	82.4	83.4	84.1	84.5	84.6	83.9	82.7	79.3	82.3	129.7
630	83.3	81.6	79.9	79.3	78.6	78.9	79.4	80.6	82.4	83.6	84.8	85.4	85.6	84.3	82.4	78.3	82.7	130.1
800	83.7	81.6	80.2	79.4	78.9	78.7	79.4	80.6	82.2	83.7	84.6	85.7	86.4	84.9	82.1	78.5	82.9	130.3
1000	85.6	82.8	81.3	79.4	79.6	79.1	79.6	80.8	82.8	84.3	84.4	85.4	86.4	85.3	81.4	77.8	83.1	130.5
1250	85.0	82.5	81.3	79.8	79.3	79.0	79.3	80.3	82.5	84.5	85.0	85.1	85.5	84.8	80.8	76.9	83.0	130.4
1600	84.8	83.0	81.8	80.6	79.5	78.8	78.3	79.5	81.8	83.6	84.5	84.1	85.1	83.1	80.0	76.4	82.4	129.8
2000	88.2	85.9	84.0	82.5	81.2	79.4	78.4	79.4	81.4	82.4	84.2	83.8	84.4	82.5	79.4	75.8	82.7	130.1
2500	92.2	93.4	94.9	91.7	89.9	86.2	82.4	82.0	82.5	83.4	83.5	85.3	86.7	84.4	80.7	78.3	88.0	135.4
3150	88.6	88.7	87.3	84.2	83.0	80.4	77.2	77.4	79.2	80.1	81.4	82.2	83.4	81.1	78.1	75.0	82.9	130.3
4000	91.3	90.9	89.8	87.1	84.9	82.6	78.4	77.4	79.6	80.1	81.3	81.4	82.9	81.4	78.4	75.2	84.6	132.0
5000	93.4	94.1	93.8	91.4	90.1	87.4	83.3	78.8	80.8	80.8	81.9	82.1	83.8	82.7	80.3	75.4	88.2	135.6
6300	91.6	92.8	92.3	90.3	89.9	87.3	80.8	78.8	80.1	80.6	82.3	83.9	85.3	80.4	78.4	75.6	87.9	135.3
8000	92.8	94.4	94.3	92.8	92.3	90.8	83.6	81.0	83.1	83.8	85.6	87.3	89.3	85.3	82.1	77.3	91.2	138.6
10000	91.2	92.4	92.2	90.5	90.0	88.7	81.9	79.8	82.2	82.0	83.3	83.6	84.9	81.2	79.1	74.2	89.8	137.2
12500	90.1	91.0	90.8	90.1	90.0	89.0	83.7	81.8	85.2	86.2	88.4	87.6	87.7	84.0	81.7	74.7	92.1	139.5
16000	84.0	85.8	86.2	84.2	84.8	83.3	78.0	79.8	83.7	85.2	87.2	87.5	87.9	83.5	81.2	74.0	91.2	138.6
20000	78.5	80.0	80.5	79.3	78.7	76.3	73.6	75.8	80.5	82.0	82.3	82.8	83.0	80.0	77.7	70.1	89.3	136.7
OVERALL	101.7	102.3	102.1	100.1	99.4	97.7	94.0	93.8	95.9	96.9	98.1	98.6	99.6	98.4	97.8	95.7	100.5	147.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	72.4	83.7	89.6	90.5	91.4	90.6	88.9	89.3	90.8	91.6	91.8	91.9	91.6	88.1	82.7	75.0		

TABLE X. - Concluded. NOISE OF QF-3 CONFIGURATION 38 - SUPPRESSOR A, FIRST INLET SECTION ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3158 rpm; fundamental blade passage frequency, 2789 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	80.9	77.1	79.7	78.4	80.9	78.9	80.4	81.1	81.2	80.6	81.2	83.2	84.4	85.2	87.7	88.8	82.6	130.0
63	75.4	77.4	76.4	75.9	76.7	76.2	77.2	77.2	78.1	79.1	80.6	82.7	84.4	86.6	88.7	89.3	82.1	129.5
80	77.6	76.5	74.7	74.8	75.0	75.8	75.8	77.0	78.7	80.3	82.2	84.6	87.5	89.5	91.5	91.4	84.2	131.6
100	86.7	82.0	82.0	80.4	80.9	78.9	80.4	82.5	82.7	84.2	86.4	87.6	90.2	91.5	93.4	92.7	86.9	134.3
125	80.4	78.2	75.2	79.0	80.2	81.4	82.2	84.0	85.2	86.4	87.9	89.3	90.2	91.9	93.2	90.6	87.3	134.7
160	80.2	80.2	81.2	81.0	82.2	83.2	84.0	85.0	85.2	86.3	86.5	87.9	88.5	89.7	90.7	87.9	86.2	133.6
200	80.3	80.7	80.8	80.8	81.0	81.2	81.7	81.3	82.2	83.2	83.7	86.1	87.5	88.8	89.7	86.9	84.5	131.9
250	81.4	81.4	81.7	80.1	80.2	80.4	81.4	82.4	84.2	85.4	87.1	88.3	88.9	90.1	90.1	87.1	85.8	133.2
315	84.8	82.6	81.8	81.4	82.5	82.9	83.4	83.9	84.6	85.8	86.4	87.5	88.4	89.4	88.8	85.0	85.7	133.1
400	82.2	81.7	81.0	81.2	81.0	81.5	82.3	83.3	84.8	86.2	87.3	87.9	88.7	89.2	88.0	84.4	85.7	133.1
500	83.1	82.1	81.5	81.3	81.5	82.5	83.5	84.1	86.0	86.8	87.8	88.1	88.6	88.3	87.1	83.5	85.9	133.3
630	86.2	84.4	82.5	82.0	82.4	82.2	83.2	84.5	86.2	87.2	88.9	89.1	89.4	87.9	86.4	82.6	86.4	133.8
800	86.2	83.8	82.7	82.3	82.0	82.2	83.5	84.5	86.0	87.3	88.5	89.4	90.2	88.0	86.0	82.4	86.5	133.9
1000	88.2	84.9	84.0	82.4	82.2	83.0	84.0	84.5	86.7	88.7	88.4	89.1	90.2	88.0	85.5	81.9	86.8	134.2
1250	88.0	85.8	84.3	83.1	82.8	82.6	84.0	84.6	86.6	88.3	88.6	89.1	89.3	87.1	84.6	80.7	86.7	134.1
1600	87.2	85.6	83.9	83.4	82.1	82.1	82.7	84.4	86.6	88.1	88.2	88.5	88.7	86.1	83.7	80.1	86.2	133.6
2000	88.0	87.5	85.7	84.0	82.7	82.0	82.0	84.1	86.3	87.1	88.5	87.6	88.8	85.6	83.3	79.4	86.2	133.6
2500	93.2	94.0	93.2	92.5	89.4	87.7	84.3	84.5	85.5	86.0	87.8	88.6	88.5	85.5	82.8	79.9	88.9	136.3
3150	92.8	93.6	92.6	92.1	89.1	87.1	83.6	82.9	84.1	85.1	86.1	87.5	88.8	85.8	82.8	79.3	88.5	135.9
4000	91.8	91.5	90.2	88.5	86.7	84.3	82.3	81.5	83.2	84.0	85.3	85.3	86.6	84.1	81.7	77.2	86.6	134.0
5000	94.1	94.3	92.1	90.1	89.0	86.3	84.1	81.1	83.1	83.3	84.9	84.6	85.8	83.4	81.6	76.5	88.1	135.5
6300	92.9	93.7	93.1	90.8	90.9	88.6	83.6	82.4	83.6	83.4	85.1	86.4	87.3	82.8	80.8	77.0	89.3	136.7
8000	92.7	94.4	93.6	92.1	90.5	89.1	84.1	82.9	86.3	86.4	88.3	89.4	90.4	86.3	83.5	78.8	91.3	138.7
10000	90.8	92.2	91.6	89.6	89.1	87.8	82.7	81.7	83.9	83.7	84.9	85.1	86.1	83.4	81.3	75.8	89.8	137.2
12500	89.6	90.3	90.6	89.5	89.3	88.0	84.5	82.9	86.1	87.0	89.0	88.0	87.8	84.3	82.8	75.6	92.1	139.5
16000	84.8	87.0	86.6	85.3	85.8	84.5	80.8	82.6	85.1	86.3	88.2	88.5	88.3	84.1	82.0	75.4	92.3	139.7
20000	79.4	80.8	81.4	80.0	79.0	78.0	78.0	79.9	83.3	84.8	84.5	84.5	84.3	81.2	79.4	72.5	91.3	138.7
OVERALL	102.9	103.2	102.3	101.0	99.9	98.6	97.0	97.3	99.0	100.1	101.2	101.9	102.7	101.9	101.9	99.9	102.3	149.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	74.1	85.2	85.7	92.1	92.5	92.7	91.9	92.7	94.2	94.9	95.7	95.6	94.9	91.0	86.3	78.4		

TABLE XI. - NOISE OF QF-3 CONFIGURATION 39 - SUPPRESSOR A, FIRST TWO INLET SECTIONS ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15^{0} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2155 rpm; fundamental blade passage frequency, 1903 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	70.0	67.5	69.2	67.5	68.4	69.4	70.4	70.7	69.9	68.9	70.5	72.6	71.4	73.2	75.4	75.1	71.0	118.4
63	68.9	67.5	68.0	67.4	67.7	68.2	70.0	68.4	67.5	67.4	69.0	70.9	70.7	72.7	74.7	75.2	70.0	117.4
80	71.7	70.9	69.2	70.7	69.4	68.5	70.4	68.7	68.7	69.0	70.9	73.1	73.5	74.7	76.2	76.7	71.7	119.1
100	69.4	67.9	68.4	66.6	68.4	68.9	69.7	69.9	69.9	71.2	73.1	74.8	75.6	76.4	78.6	77.6	72.9	120.3
125	70.2	70.0	68.7	69.2	69.7	71.3	70.8	71.3	72.3	72.8	74.5	75.3	75.7	76.7	78.0	77.4	73.6	121.0
160	71.4	70.7	71.2	70.6	71.1	71.6	71.6	72.2	72.7	73.4	73.6	75.0	73.9	74.9	75.9	74.8	73.1	120.5
200	74.3	76.3	71.6	72.6	71.6	70.6	70.8	70.8	71.6	71.3	71.1	73.2	72.6	73.4	74.8	73.7	72.3	119.7
250	73.3	73.9	71.8	70.3	69.9	69.1	69.1	70.1	71.3	72.6	74.3	75.4	75.3	75.4	75.6	73.5	72.9	120.3
315	76.1	74.5	73.3	71.1	71.8	71.5	71.5	72.5	73.0	74.1	74.8	75.4	75.0	74.6	74.6	73.2	73.6	121.0
400	76.9	75.0	73.2	71.7	71.0	70.5	70.5	71.4	72.5	74.0	75.4	75.6	76.0	75.7	74.5	71.8	73.8	121.2
500	77.5	75.8	74.3	73.5	72.3	71.8	71.7	72.5	73.5	75.5	76.2	76.6	76.3	75.7	73.7	71.2	74.6	122.0
630	77.4	76.6	74.9	73.3	72.6	71.4	71.3	72.4	73.9	75.6	77.4	77.7	77.8	77.6	74.1	71.0	75.3	122.7
800	78.6	78.1	76.8	74.4	72.9	71.8	71.3	72.4	73.9	75.3	76.8	78.5	78.9	79.3	73.9	70.6	75.9	123.3
1000	79.8	77.0	75.7	73.8	71.8	71.3	71.5	72.2	73.7	75.3	77.0	76.9	78.3	79.3	74.0	70.9	75.5	122.9
1250	77.2	76.1	75.3	73.1	71.1	70.6	70.1	70.9	72.6	75.1	76.2	76.2	76.6	77.4	73.1	69.1	74.5	121.9
1600	80.9	80.4	78.8	77.3	74.9	72.9	70.4	70.4	71.4	73.6	75.1	74.7	75.6	75.8	71.8	68.7	75.1	122.5
2000	87.8	90.0	86.1	84.6	82.3	78.5	74.6	73.6	73.6	75.0	76.0	75.7	78.1	78.8	75.1	72.9	81.0	128.4
2500	79.1	79.9	78.7	76.2	73.9	71.4	69.1	68.2	69.6	71.1	72.4	72.0	72.9	73.4	68.7	65.8	73.7	121.1
3150	82.1	82.3	81.1	78.8	76.4	73.1	68.9	68.2	69.7	71.1	71.9	72.2	73.1	72.7	69.3	66.5	75.5	122.9
4000	87.5	87.6	86.8	85.0	81.8	78.0	73.0	70.8	71.4	72.8	73.6	73.7	75.6	76.0	73.0	70.2	80.6	128.0
5000	86.3	86.3	85.0	82.8	80.7	76.9	72.5	69.2	71.3	72.3	73.8	73.2	75.7	76.0	72.7	67.8	79.6	127.0
6300	87.3	88.4	87.4	85.4	84.5	80.7	73.9	71.5	72.9	74.1	76.1	77.9	80.4	77.2	73.9	70.2	82.7	130.1
8000	86.3	88.3	87.8	86.5	84.8	81.5	74.4	73.7	78.1	78.2	79.7	81.5	83.3	80.8	76.7	71.6	84.6	132.0
10000	86.7	87.7	88.0	87.2	86.9	85.6	78.3	75.8	79.6	79.6	81.1	81.1	82.6	79.9	77.0	70.9	86.5	133.9
12500	85.1	85.2	85.6	84.5	85.1	82.7	75.0	73.9	79.3	81.1	83.1	82.8	84.1	81.6	79.2	71.5	86.8	134.2
16000	75.9	77.2	76.5	74.2	74.0	70.4	64.3	67.1	71.5	74.6	77.0	77.3	78.8	76.2	73.8	66.5	81.1	128.5
20000	70.4	71.4	70.9	68.6	67.1	62.5	55.7	60.2	66.3	68.8	70.2	70.6	71.7	69.9	66.4	59.7	77.4	124.8
OVER ALL	96.3	97.1	96.0	94.5	93.3	90.9	85.3	85.7	87.8	89.0	90.5	91.0	92.1	91.2	89.3	87.0	93.7	141.1
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	67.7	79.2	81.9	83.7	83.9	82.6	80.3	80.2	81.3	82.5	83.1	82.5	82.4	80.5	74.5	67.3		

TABLE XI. - Continued. NOISE OF QF-3 CONFIGURATION 39 - SUPPRESSOR A,

FIRST TWO INLET SECTIONS ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2513 rpm; fundamental blade passage frequency, 2219 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	77.7	75.7	74.2	74.7	73.7	76.0	73.9	73.7	74.7	76.0	76.2	78.1	77.5	78.2	80.5	81.1	76.5	123.9
63	75.5	74.3	73.8	73.8	72.0	73.5	72.0	71.5	72.2	73.7	75.0	76.9	77.2	78.3	80.2	80.7	75.4	122.8
80	77.5	75.2	77.8	72.5	73.2	72.5	73.2	71.8	72.7	75.3	76.3	77.9	79.2	80.5	82.3	82.2	76.9	124.3
100	75.5	73.9	73.4	71.9	71.2	72.7	73.4	73.2	74.9	76.7	77.9	79.6	81.0	82.0	83.9	83.4	78.0	125.4
125	75.2	75.0	75.2	74.2	74.0	75.0	75.9	76.7	76.7	79.0	79.4	81.3	81.7	82.4	83.9	83.1	79.1	126.5
160	76.6	75.4	75.9	75.6	75.7	76.6	77.1	77.2	77.2	78.4	79.1	80.1	79.9	80.9	81.6	80.4	78.4	125.8
200	76.2	76.0	75.3	74.3	74.0	74.8	74.5	74.7	74.5	75.3	76.5	77.2	77.8	79.5	79.8	78.4	76.3	123.7
250	78.5	77.8	76.2	75.7	76.8	73.8	74.2	74.7	75.8	77.2	78.8	79.9	80.5	80.8	80.7	78.0	77.8	125.2
315	77.9	77.2	76.2	75.5	76.0	75.4	75.0	76.7	77.5	78.0	79.0	80.1	80.0	80.2	79.7	77.1	78.0	125.4
400	80.0	79.1	77.3	75.9	75.6	74.9	74.4	75.9	76.8	77.9	79.1	80.4	80.6	80.4	78.9	76.2	78.1	125.5
500	80.7	79.9	78.0	76.5	76.2	75.9	75.7	76.9	78.2	79.4	80.5	81.1	80.7	80.2	78.5	75.4	78.8	126.2
630	81.5	79.5	78.2	77.0	76.5	75.2	75.5	76.2	77.9	79.7	81.4	81.8	81.4	80.9	77.9	75.1	79.1	126.5
800	81.4	79.4	78.4	77.4	76.4	75.4	75.2	76.5	77.7	79.5	81.0	82.1	82.7	82.2	77.9	74.6	79.4	126.8
1000	85.4	80.9	78.9	76.9	76.4	76.3	75.3	76.9	77.8	79.8	80.9	81.3	82.3	82.6	77.8	74.6	79.6	127.0
1250	80.7	79.2	77.5	76.2	75.2	74.8	74.2	75.2	77.0	79.5	80.5	80.8	81.2	81.5	76.8	73.1	78.6	126.0
1600	85.6	80.8	79.1	77.6	76.6	75.0	73.8	74.4	76.6	78.9	79.9	79.5	80.6	79.8	75.4	72.3	78.5	125.9
2000	89.3	87.3	85.5	84.3	81.7	79.5	75.7	75.7	77.2	78.3	79.8	79.9	81.2	80.8	76.0	73.6	81.4	128.8
2500	85.0	86.7	84.7	83.7	80.7	78.7	74.5	74.4	75.4	76.4	77.9	78.6	80.0	79.5	75.2	71.9	80.2	127.6
3150	85.1	84.6	83.1	80.7	78.4	75.9	72.1	72.1	74.2	75.2	76.6	77.2	78.2	76.9	73.4	70.3	78.5	125.9
4000	89.2	89.4	88.1	85.2	82.6	79.9	74.7	73.0	74.9	76.2	77.0	77.8	79.5	78.4	74.9	71.8	82.2	129.6
5000	89.1	89.6	88.3	86.0	83.5	80.6	75.1	73.0	74.8	75.8	77.0	77.1	79.1	78.4	75.6	71.6	82.8	130.2
6300	89.8	90.8	90.4	88.0	87.8	84.6	77.4	75.5	75.6	76.8	78.5	80.3	82.3	78.0	75.3	72.4	85.5	132.9
8000	88.7	90.7	90.2	88.5	87.0	84.6	77.3	75.5	78.7	79.2	81.0	83.3	85.0	81.6	78.0	73.2	86.6	134.0
10000	87.8	88.9	88.8	87.1	86.2	84.6	77.3	75.7	78.9	78.6	80.4	80.4	81.6	79.0	75.6	70.5	86.3	133.7
12500	87.5	87.9	88.2	87.5	87.5	87.0	80.2	77.2	81.6	82.8	84.5	83.7	84.5	81.3	78.7	72.0	89.1	136.5
16000	79.9	81.1	80.8	79.0	79.4	77.0	73.5	72.5	76.7	79.5	81.7	81.4	81.8	79.0	75.6	69.1	85.4	132.8
20000	74.6	75.8	75.0	73.5	71.7	68.8	63.4	66.6	71.9	73.8	75.1	75.2	75.8	73.3	70.1	63.6	82.0	129.4
OVERALL	99.0	99.0	98.2	96.5	95.4	93.7	89.7	89.4	91.1	92.5	93.8	94.5	95.3	94.6	93.3	91.7	96.3	143.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	70.5	79.6	83.9	85.4	86.0	85.6	83.3	83.7	85.2	86.3	87.2	86.9	86.5	83.9	77.9	70.5		

TABLE XI. - Continued. NOISE OF QF-3 CONFIGURATION 39 - SUPPRESSOR A,

FIRST TWO INLET SECTIONS ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2870 rpm; fundamental blade passage frequency, 2535 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	83.3	77.7	81.8	82.2	84.8	82.0	78.3	80.7	79.0	78.0	81.7	81.4	81.0	82.7	84.8	85.2	81.7	129.1
63	72.8	75.6	74.5	74.5	75.0	74.0	74.3	74.5	75.8	75.8	77.0	79.2	80.5	82.3	84.3	85.0	78.4	125.8
80	76.3	75.1	73.8	73.0	73.6	73.3	72.6	74.1	75.1	76.3	78.0	80.2	82.8	84.8	86.6	86.7	79.8	127.2
100	79.0	77.5	78.8	75.3	74.2	75.3	75.7	77.5	79.3	80.3	82.0	83.8	85.3	86.7	88.5	88.0	82.3	129.7
125	77.3	75.4	75.4	76.3	76.4	78.1	77.8	79.9	80.4	82.4	82.8	85.0	85.4	87.1	88.6	87.3	82.9	130.3
160	78.2	77.0	78.4	77.9	78.9	80.0	80.2	81.0	81.5	82.5	83.0	84.3	84.0	85.5	86.5	84.6	82.4	129.8
200	77.6	78.0	77.5	78.0	77.8	78.1	78.5	78.8	78.6	79.5	80.3	81.6	82.6	84.3	84.8	83.0	80.5	127.9
250	78.8	78.8	77.8	77.3	77.5	77.3	77.0	78.3	79.8	81.0	82.5	83.6	84.3	85.5	85.8	82.9	81.5	128.9
315	79.5	79.0	78.3	78.0	79.0	79.3	79.8	80.2	81.5	82.2	82.7	83.9	84.3	84.5	84.3	81.5	81.8	129.2
400	81.1	79.8	79.5	78.3	77.8	78.3	78.5	79.3	80.8	82.1	82.6	83.9	84.6	84.8	83.5	80.7	81.7	129.1
500	83.3	80.9	79.9	79.1	78.9	79.1	79.6	80.8	82.4	83.1	84.1	84.5	84.4	84.1	82.4	79.6	82.3	129.7
630	83.5	81.0	79.9	79.4	79.0	79.2	79.2	80.4	81.9	83.9	85.0	85.5	85.4	84.4	82.0	79.1	82.7	130.1
800	83.4	81.2	79.7	79.4	79.0	79.2	79.2	80.2	81.7	83.4	84.4	85.8	86.7	85.5	82.0	78.9	82.9	130.3
1000	85.6	82.2	80.6	79.4	78.7	79.1	79.4	80.2	82.4	83.9	84.6	85.3	86.4	85.6	81.6	78.6	83.0	130.4
1250	83.6	81.3	80.3	79.0	78.6	78.5	79.0	79.5	82.1	84.3	84.8	84.9	85.3	85.3	81.1	77.2	82.7	130.1
1600	83.7	81.4	80.4	79.2	78.2	78.1	77.6	79.2	81.7	83.7	84.2	84.5	85.2	83.7	80.1	76.3	82.2	129.6
2000	84.0	82.7	81.4	80.1	78.7	77.7	75.7	78.2	80.5	82.4	83.9	83.5	84.4	82.9	79.2	76.1	81.7	129.1
2500	89.9	90.4	89.6	89.9	87.4	84.6	80.4	80.1	80.9	81.9	83.3	84.7	87.1	84.8	80.4	77.2	85.8	133.2
3150	86.5	85.4	84.4	82.0	80.5	78.2	75.7	76.2	78.2	79.7	80.7	81.6	83.0	80.9	78.0	74.1	81.3	128.7
4000	89.9	88.2	87.2	85.1	82.8	80.1	76.4	75.7	77.7	79.2	80.6	81.0	82.4	80.6	77.9	73.8	82.8	130.2
5000	91.4	91.6	91.3	90.3	88.4	85.4	81.4	77.4	78.9	79.6	80.9	81.0	83.3	81.7	79.2	74.5	86.4	133.8
6300	89.8	91.0	90.1	88.0	87.6	84.6	78.1	76.8	78.0	79.0	80.6	82.1	83.5	79.1	77.0	73.9	85.8	133.2
8000	91.1	92.6	92.8	91.1	90.4	88.4	81.6	79.4	81.1	82.3	83.9	86.3	88.1	83.9	80.6	76.1	89.5	136.9
10000	89.0	89.8	90.2	88.0	87.7	86.0	78.9	77.4	79.3	79.5	81.0	81.2	82.5	79.5	77.5	72.0	87.4	134.8
12500	87.9	88.6	88.7	88.0	88.5	87.2	80.8	79.0	81.6	83.7	85.5	84.4	84.5	81.5	79.8	72.3	89.7	137.1
16000	81.6	83.1	83.1	81.4	82.4	80.4	74.8	76.1	79.3	82.4	84.3	84.3	84.3	80.5	78.4	71.3	88.1	135.5
20000	75.8	76.9	77.1	75.8	74.9	72.9	68.4	71.2	75.7	77.9	78.8	79.0	79.3	76.2	74.0	66.7	85.4	132.8
OVERALL	100.1	100.1	99.8	98.5	97.8	96.1	92.8	93.0	94.6	96.0	97.1	97.9	98.8	98.2	97.6	95.9	98.8	146.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	70.9	81.5	86.2	89.1	89.7	89.3	87.5	88.1	89.6	90.7	91.4	91.5	91.6	88.2	82.5	74.8		

TABLE XI. - Concluded. NOISE OF QF-3 CONFIGURATION 39 - SUPPRESSOR A,

FIRST TWO INLET SECTIONS ACTIVE, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3228 rpm; fundamental blade passage frequency, 2851 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	84.2	79.2	82.1	80.1	82.9	81.9	80.9	81.4	83.7	82.2	81.7	83.3	84.1	86.4	88.1	88.5	83.5	130.9
63	77.3	78.4	77.6	77.3	77.9	78.1	78.4	78.9	79.3	79.8	80.9	82.2	84.1	86.8	87.6	88.8	82.1	129.5
80	78.2	77.2	75.2	75.4	76.4	76.9	76.9	77.5	78.0	80.5	82.5	84.8	86.9	89.0	91.5	91.2	84.1	131.5
100	84.6	81.3	79.6	79.6	78.9	79.6	79.4	80.9	82.6	84.4	86.1	87.7	89.4	92.4	93.3	92.8	86.8	134.2
125	80.4	79.2	78.7	79.9	80.2	81.4	82.2	83.7	84.9	86.7	87.4	89.2	90.4	92.1	93.4	91.3	87.4	134.8
160	80.0	80.4	81.5	81.5	83.0	83.9	83.9	84.9	85.5	86.5	87.0	88.1	88.9	90.0	90.9	88.4	86.5	133.9
200	80.7	80.7	81.1	81.2	81.6	82.1	82.2	82.6	82.7	83.4	84.7	85.8	87.7	88.7	89.2	86.8	84.7	132.1
250	80.2	80.6	80.7	80.4	80.9	80.7	81.4	82.6	83.6	85.2	86.9	88.2	89.6	90.2	90.4	87.3	85.9	133.3
315	86.1	83.3	82.1	82.3	83.5	83.1	83.8	84.1	84.8	86.6	87.1	87.9	88.8	89.3	89.0	86.0	86.1	133.5
400	82.4	81.6	81.7	81.6	81.7	82.2	82.4	83.6	84.9	86.2	87.6	88.5	88.7	88.9	88.4	84.9	85.9	133.3
500	83.4	82.0	81.7	81.8	82.5	82.5	83.8	85.0	86.0	87.3	88.2	88.3	88.7	88.3	87.3	83.6	86.2	133.6
630	85.2	83.5	82.5	82.2	82.3	82.7	83.3	85.0	85.8	88.0	89.3	89.6	89.5	88.2	86.5	83.4	86.7	134.1
800	86.4	83.5	82.2	82.0	82.5	82.4	83.5	84.7	85.9	87.5	88.7	90.0	90.0	88.5	86.4	82.9	86.7	134.1
1000	88.5	85.5	83.3	82.2	82.3	83.0	84.0	85.0	87.0	88.7	89.2	89.9	90.3	88.2	85.7	82.7	87.1	134.5
1250	87.9	85.1	83.1	82.4	82.4	82.4	83.7	85.1	87.2	88.6	89.2	89.3	89.6	87.2	85.1	81.5	86.9	134.3
1600	86.6	84.1	82.6	82.5	81.6	81.8	82.6	84.1	86.6	88.1	88.5	88.7	89.0	86.1	84.1	80.7	86.2	133.6
2000	86.1	84.6	83.5	82.3	81.5	81.3	81.8	84.1	85.8	87.1	89.1	87.9	88.8	85.8	83.5	79.7	86.0	133.4
2500	89.8	89.5	88.3	86.7	85.3	83.7	81.8	83.3	84.7	85.7	87.8	88.6	88.7	85.5	82.8	79.2	86.6	134.0
3150	92.7	92.4	91.7	90.2	88.7	86.2	83.4	83.2	84.4	85.0	86.7	89.2	89.9	86.9	83.4	80.6	88.3	135.7
4000	90.6	89.3	87.8	86.8	84.6	82.3	80.8	80.7	82.8	83.6	84.9	85.0	86.6	83.7	81.1	77.0	85.4	132.8
5000	92.1	91.8	89.8	88.0	86.8	84.3	82.1	80.0	82.1	82.6	84.6	83.9	85.0	83.0	81.0	75.9	86.4	133.8
6300	91.9	92.7	91.7	90.2	89.9	86.9	82.7	81.4	81.9	82.5	84.4	85.2	86.1	82.0	79.9	76.3	88.2	135.6
8000	91.3	93.1	92.1	90.9	89.1	87.3	82.8	81.6	84.2	84.7	87.0	88.0	89.0	84.7	81.9	77.4	89.8	137.2
10000	89.1	90.3	90.0	88.1	87.2	85.2	81.0	79.7	81.8	81.8	83.5	83.7	84.4	82.0	79.8	74.2	88.0	135.4
12500	87.9	88.7	88.2	87.7	87.4	85.8	82.1	80.5	83.2	84.6	86.2	85.6	85.0	81.9	79.9	73.2	89.8	137.2
16000	83.4	84.9	84.7	83.4	83.7	82.1	78.1	79.4	81.4	83.2	85.7	85.5	84.7	81.1	79.1	72.6	89.5	136.9
20000	76.6	77.9	78.1	77.1	76.2	74.4	73.7	75.6	78.8	80.3	81.1	80.6	80.4	77.3	75.4	68.6	87.4	134.8
OVERALL	101.8	101.5	100.5	99.4	98.7	97.5	96.4	97.1	98.6	99.8	101.1	101.8	102.5	102.0	101.9	100.0	101.2	148.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	72.6	83.4	88.2	90.5	91.8	91.8	91.4	92.3	93.9	94.8	95.8	96.0	95.3	91.4	86.5	78.6		

TABLE XII. - NOISE OF QF-3 CONFIGURATION 40 - SUPPRESSOR A, FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2148 rpm; fundamental blade passage frequency, 1897 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	69.1	67.3	69.1	67.0	66.8	67.1	67.3	67.8	68.3	68.5	69.0	70.7	70.6	71.0	73.5	74.7	69.4	116.8
63	68.6	68.6	67.8	67.4	66.4	66.4	65.9	66.3	66.4	66.9	67.6	69.2	70.6	71.4	73.6	73.8	68.8	116.2
80	72.4	71.1	69.8	70.1	69.3	67.8	68.4	67.9	68.6	68.3	69.9	71.2	72.9	72.9	75.6	76.5	71.0	118.4
100	69.4	68.9	68.9	68.8	68.9	68.8	68.8	69.4	70.6	71.3	72.4	73.2	74.9	76.3	77.4	76.7	72.4	119.8
125	71.3	70.6	69.9	70.1	70.3	70.4	71.3	71.3	72.3	73.4	73.8	75.0	75.8	75.9	76.8	75.8	73.3	120.7
160	71.8	72.4	71.8	71.6	72.3	71.3	71.8	72.3	72.9	73.6	73.4	74.0	73.9	74.3	74.8	73.7	73.0	120.4
200	73.1	75.8	70.9	73.3	72.4	70.9	70.6	70.9	71.8	71.1	71.1	72.3	72.6	73.4	73.8	71.5	72.1	119.5
250	73.0	74.0	72.0	70.8	70.0	70.2	70.0	71.7	72.3	72.8	74.0	75.1	75.8	75.0	74.3	72.4	73.0	120.4
315	75.3	74.5	73.3	71.3	72.0	72.5	72.1	73.1	73.3	73.8	74.1	75.1	74.6	74.3	74.0	71.2	73.5	120.9
400	77.2	75.5	73.2	72.2	71.7	71.2	71.7	71.8	73.2	74.0	75.3	75.4	76.5	75.5	74.0	71.2	74.0	121.4
500	77.4	75.7	74.0	73.5	72.4	71.9	72.4	73.0	74.4	75.0	76.2	76.4	76.4	75.4	73.5	70.4	74.6	122.0
630	77.6	76.5	74.3	73.3	72.3	71.5	71.5	72.9	74.3	75.6	77.1	77.6	78.0	76.8	73.8	70.3	75.2	122.6
800	79.1	78.0	75.8	74.1	72.6	71.5	71.5	72.3	74.1	75.3	77.1	77.7	79.5	78.8	73.8	70.2	75.8	123.2
1000	80.0	76.5	74.1	72.3	71.5	71.1	71.3	72.0	73.6	75.5	76.6	76.2	78.3	78.5	74.0	70.3	75.1	122.5
1250	76.8	74.3	72.6	71.3	70.3	69.8	69.9	71.1	72.6	74.6	75.8	76.2	76.9	77.3	72.6	68.8	74.1	121.5
1600	78.8	78.0	76.7	75.2	72.7	70.8	69.3	69.8	71.0	73.3	74.5	74.3	75.3	74.7	71.0	68.1	73.8	121.2
2000	82.6	84.9	82.7	80.4	78.4	74.4	71.7	71.1	72.1	73.1	74.1	75.7	76.6	76.7	72.2	71.6	77.4	124.8
2500	76.5	76.3	74.3	73.3	70.6	68.0	65.1	66.8	69.3	70.3	72.1	71.6	73.0	72.1	68.1	65.2	71.6	119.0
3150	80.6	80.7	78.9	76.6	74.2	70.6	66.9	67.4	69.5	70.7	71.5	71.8	73.2	71.9	68.7	66.1	74.0	121.4
4000	86.2	87.4	84.7	83.4	80.2	76.5	71.0	69.9	71.4	72.4	72.7	73.5	75.5	75.4	72.4	69.8	79.4	126.8
5000	85.8	86.0	83.8	81.7	79.7	75.7	71.2	69.5	71.3	72.3	73.5	73.3	76.0	75.7	73.0	68.3	78.9	126.3
6300	87.6	89.0	87.3	85.1	84.7	80.2	73.6	72.3	74.2	74.7	76.5	79.0	81.0	77.5	74.6	71.1	82.9	130.3
8000	87.0	89.2	88.2	86.7	85.2	82.1	74.6	74.6	79.1	79.2	80.2	82.2	84.5	81.2	77.7	72.7	85.2	132.6
10000	87.5	89.3	89.5	89.2	88.9	87.7	79.1	78.0	81.0	80.7	82.2	82.7	84.2	80.5	77.9	72.7	88.2	135.6
12500	87.9	87.5	87.7	87.5	87.8	87.0	78.5	76.7	82.0	83.0	85.2	84.7	85.8	82.8	80.5	73.4	89.3	136.7
16000	78.4	79.4	78.8	77.7	77.6	74.6	67.7	70.5	74.7	77.4	79.6	80.0	81.1	78.4	75.9	69.6	83.8	131.2
20000	72.4	73.7	73.1	71.9	69.6	65.6	59.9	64.2	69.7	71.4	72.7	73.4	74.4	71.5	69.0	62.4	80.0	127.4
OVERALL	96.1	97.0	95.9	94.8	94.1	92.3	86.5	86.3	88.8	89.6	91.1	91.6	93.0	91.2	89.1	86.4	94.8	142.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	65.0	76.4	79.9	82.3	82.6	81.4	79.0	79.4	81.1	81.9	82.3	82.3	82.0	79.4	73.2	66.3		

TABLE XII. - Continued. NOISE OF QF-3 CONFIGURATION 40 - SUPPRESSOR A, FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2504 rpm; fundamental blade passage frequency, 2211 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	72.8	70.7	71.5	72.2	71.7	73.3	71.3	73.5	72.8	73.7	74.2	76.6	76.0	77.2	78.8	79.9	74.7	122.1
63	68.7	70.5	70.0	69.9	69.5	69.7	69.9	70.2	70.5	70.7	72.5	75.0	75.5	77.0	79.0	79.9	73.5	120.9
80	76.1	72.3	78.1	69.1	71.5	70.6	70.1	69.8	71.5	73.0	74.6	76.2	78.0	79.8	81.1	82.2	75.7	123.1
100	71.7	70.7	70.5	69.3	69.7	70.2	70.5	72.7	74.5	75.3	77.0	78.8	80.2	81.7	83.5	83.0	77.2	124.6
125	73.2	72.7	74.0	72.5	73.0	74.5	75.4	77.0	77.2	78.5	79.0	80.3	81.2	82.2	83.5	82.4	78.7	126.1
160	75.1	74.2	75.1	74.6	75.7	76.1	76.1	76.7	77.1	77.7	77.9	79.2	79.6	79.1	80.9	79.4	77.6	125.0
200	74.6	74.2	74.2	73.4	73.7	74.1	73.7	74.4	74.1	74.6	75.2	76.5	77.9	78.6	79.2	77.4	75.6	123.0
250	77.8	76.2	74.7	74.2	74.7	73.2	73.3	74.2	75.7	77.3	78.7	79.3	80.2	79.7	80.5	77.6	77.2	124.6
315	77.0	75.7	75.0	75.0	75.2	75.4	75.7	76.9	77.0	78.0	78.7	79.8	79.9	79.4	79.2	76.3	77.6	125.0
400	78.5	77.3	75.8	75.0	74.0	74.5	74.3	75.2	77.2	78.2	79.3	80.3	80.7	80.0	78.7	75.5	77.8	125.2
500	80.1	78.0	76.5	75.3	75.1	75.3	75.8	77.0	78.3	79.1	80.0	80.9	80.5	79.8	78.0	74.9	78.4	125.8
630	81.2	78.4	76.7	75.5	75.0	74.9	75.5	76.4	78.4	79.7	80.9	81.5	81.4	80.7	77.5	74.3	78.8	126.2
800	81.2	78.7	77.4	75.7	75.4	75.2	75.4	76.5	78.2	79.9	81.0	82.0	82.9	82.0	77.5	74.3	79.3	126.7
1000	84.7	79.2	77.2	75.5	75.5	75.5	75.7	76.5	78.4	79.9	80.5	81.1	82.7	82.4	77.5	74.1	79.3	126.7
1250	80.0	77.5	76.0	74.5	74.2	74.2	74.3	75.7	77.3	79.5	80.2	81.1	81.0	81.3	76.5	72.9	78.4	125.8
1600	81.3	78.9	77.4	75.9	74.4	73.9	73.4	74.6	76.6	78.4	79.4	79.7	80.4	79.4	75.1	71.8	77.7	125.1
2000	84.4	82.9	80.7	80.2	76.4	75.7	74.1	74.4	77.1	77.7	79.1	80.0	82.1	80.7	75.4	72.5	79.1	126.5
2500	81.9	81.2	78.9	78.0	75.2	74.4	71.5	73.0	74.7	75.9	77.4	78.3	80.4	79.0	74.0	70.6	77.4	124.8
3150	82.8	82.2	80.5	77.5	75.7	73.5	70.5	71.6	74.1	75.1	76.1	76.6	78.1	76.3	73.0	69.6	76.9	124.3
4000	88.6	87.8	86.1	83.3	81.5	78.8	73.8	72.6	74.4	75.9	76.4	77.9	79.4	78.3	74.8	71.7	81.0	128.4
5000	89.1	88.1	86.5	84.3	82.6	80.0	75.0	72.6	75.0	75.5	76.6	77.3	79.3	78.3	75.8	71.6	81.8	129.2
6300	90.5	91.0	90.4	87.7	87.2	83.9	76.8	75.2	76.7	77.2	79.2	81.5	83.0	78.4	76.0	73.1	85.5	132.9
8000	89.7	91.1	90.8	88.3	86.9	84.3	77.3	75.8	79.8	80.0	81.5	84.3	85.8	82.0	79.0	74.2	87.0	134.4
10000	88.6	90.0	90.3	88.6	88.2	86.8	79.9	77.2	80.5	80.0	81.0	82.1	83.3	79.4	77.3	72.2	87.9	135.3
12500	89.9	90.9	90.9	90.2	90.7	90.2	83.6	79.8	83.9	84.7	86.4	86.3	86.5	82.9	81.4	73.7	91.8	139.2
16000	82.6	83.6	83.6	81.7	82.0	80.1	73.6	75.8	79.5	81.6	83.9	84.5	84.8	80.9	78.8	71.7	88.1	135.5
20000	77.1	77.8	77.8	76.0	74.6	72.2	65.9	70.0	75.6	76.7	77.6	78.8	79.1	75.6	73.0	66.4	85.0	132.4
OVERALL	98.7	98.7	98.2	96.4	95.9	94.5	90.0	89.6	91.8	92.8	94.0	95.0	95.9	94.4	93.2	91.2	97.3	144.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	67.5	77.0	81.8	83.4	84.4	84.4	82.3	83.0	85.2	86.0	86.7	86.8	86.8	83.6	77.3	69.8		

TABLE XII. - Continued. NOISE OF QF-3 CONFIGURATION 40 - SUPPRESSOR A, FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2859 rpm; fundamental blade passage frequency, 2525 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	81.8	76.1	80.6	80.9	80.6	79.9	79.8	80.3	80.6	79.6	80.8	80.0	80.4	81.4	84.4	84.2	80.8	128.2
63	72.6	74.8	74.4	73.4	73.6	74.3	73.4	74.6	75.4	75.3	76.4	78.0	80.3	81.4	83.6	84.6	77.8	125.2
80	74.7	74.4	73.9	72.2	73.5	72.7	72.5	73.5	75.4	76.5	78.4	80.3	82.5	84.4	86.5	87.4	79.8	127.2
100	80.6	79.7	80.6	77.9	73.7	75.2	75.6	77.9	79.9	81.1	82.4	83.0	85.4	87.1	88.2	88.3	82.5	129.9
125	77.5	75.8	75.5	76.1	77.1	78.1	79.0	80.0	81.1	82.3	83.5	84.7	86.3	86.8	88.5	86.8	83.0	130.4
160	77.9	77.4	78.4	77.9	79.6	79.6	79.9	81.2	81.6	82.2	82.7	84.0	84.1	84.9	86.1	84.3	82.2	129.6
200	77.5	77.5	77.8	78.8	78.3	78.3	78.8	79.0	79.3	79.5	80.6	81.2	82.6	84.0	84.6	82.2	80.5	127.9
250	78.8	79.0	77.8	77.0	78.3	77.8	77.3	78.5	80.2	81.3	82.3	83.9	84.8	85.3	85.3	82.7	81.6	129.0
315	79.6	79.8	78.8	78.5	79.1	79.3	79.8	80.5	81.3	82.5	82.8	84.0	84.0	84.1	84.0	81.7	81.8	129.2
400	80.3	78.9	78.6	77.6	78.3	77.9	78.6	79.8	81.1	82.4	83.4	84.3	84.6	84.3	83.4	80.3	81.8	129.2
500	82.2	80.5	79.2	78.7	78.5	79.0	79.7	80.7	82.4	83.5	84.0	84.5	84.7	84.0	82.7	79.2	82.3	129.7
630	83.2	80.7	79.0	78.9	78.4	78.7	79.5	80.5	82.2	83.9	84.7	85.5	85.4	84.0	82.2	78.4	82.6	130.0
800	83.3	80.8	79.4	78.8	78.4	78.8	79.4	80.8	82.1	83.4	84.8	86.3	86.3	84.9	81.9	78.6	82.9	130.3
1000	85.7	82.4	80.4	79.0	79.2	79.0	79.9	80.9	83.0	84.4	84.7	85.6	86.5	85.4	81.9	78.2	83.2	130.6
1250	83.9	80.6	79.9	78.1	78.2	78.4	79.1	80.4	82.9	84.2	85.2	85.5	85.1	84.6	80.6	77.0	82.8	130.2
1600	82.6	80.1	79.0	77.8	77.3	77.5	78.0	79.6	82.3	83.8	84.1	84.6	84.8	83.1	79.8	76.0	82.0	129.4
2000	82.8	80.4	78.9	77.6	76.8	76.8	75.6	79.1	81.4	82.6	83.8	83.5	84.3	82.1	79.3	75.5	81.4	128.8
2500	85.6	84.1	82.7	80.9	80.2	78.1	75.9	78.7	80.6	81.2	82.9	84.8	86.9	83.1	78.7	75.1	82.5	129.9
3150	84.9	83.8	82.1	79.1	77.8	76.6	74.9	76.8	78.8	80.3	80.8	81.9	82.7	80.3	77.1	74.0	80.5	127.9
4000	88.9	87.9	85.8	82.8	80.6	78.4	75.8	76.6	78.9	79.6	80.6	81.4	82.4	80.3	77.4	74.0	82.1	129.5
5000	91.2	90.3	89.2	86.5	85.0	81.9	79.2	76.5	79.3	79.7	80.8	81.3	83.5	81.5	79.3	74.6	84.6	132.0
6300	90.0	90.8	90.7	87.2	86.3	83.2	77.6	77.3	79.5	79.7	81.0	83.3	84.2	79.3	77.3	74.1	85.7	133.1
8000	91.5	93.0	92.5	90.0	89.0	86.5	80.5	79.6	82.6	82.8	84.8	86.9	88.5	84.3	81.1	77.1	89.2	136.6
10000	90.1	91.2	91.4	88.8	88.0	86.4	80.0	78.7	81.2	80.9	81.8	82.4	83.7	80.2	78.4	73.4	88.4	135.8
12500	89.9	90.8	91.5	90.5	90.8	89.7	84.4	81.8	84.5	85.7	86.8	86.7	86.3	82.1	80.8	74.2	92.0	139.4
16000	83.9	85.2	85.7	83.9	84.7	82.8	77.7	79.7	82.9	84.7	86.4	86.8	86.4	82.3	80.1	73.4	90.5	137.9
20000	77.7	79.0	79.7	78.2	77.2	74.9	71.9	74.8	79.4	80.5	81.1	81.4	81.5	78.0	75.8	68.8	87.9	135.3
OVERALL	99.9	99.9	99.6	97.5	97.0	95.6	93.0	93.6	95.5	96.5	97.5	98.4	99.1	97.9	97.4	95.8	99.3	146.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	68.9	78.4	83.0	84.7	86.3	86.4	86.1	87.8	89.9	90.6	91.3	91.6	91.5	87.3	81.9	74.0		

TABLE XII. - Concluded. NOISE OF QF-3 CONFIGURATION 40 - SUPPRESSOR A, FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3213 rpm; fundamental blade passage frequency, 2838 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	83.4	78.7	81.4	79.1	80.9	79.2	79.7	80.6	82.4	81.7	81.6	83.2	84.7	85.1	87.9	88.9	82.9	130.3
63	76.2	77.7	76.8	76.2	76.5	76.5	77.5	77.5	78.7	79.2	80.3	81.6	83.3	86.0	88.2	89.6	81.8	129.2
80	77.4	76.7	75.2	74.9	75.4	75.9	75.9	76.7	77.7	79.9	81.6	84.6	87.1	88.4	91.6	91.9	84.0	131.4
100	85.2	81.0	80.0	78.9	79.2	79.5	79.0	81.4	81.7	84.0	85.9	87.6	89.9	91.0	93.4	93.1	86.6	134.0
125	81.2	77.7	79.1	79.2	80.7	81.4	81.7	83.7	85.1	86.4	87.1	88.8	90.4	91.1	93.4	90.9	87.1	134.5
160	80.4	79.6	81.2	81.6	82.6	83.9	83.9	84.4	85.6	86.2	86.6	88.3	88.4	89.2	90.7	87.6	86.2	133.6
200	80.0	81.0	81.0	81.5	81.5	81.8	82.3	82.3	83.0	83.1	83.6	85.4	87.0	88.6	89.8	86.7	84.5	131.9
250	82.6	81.7	82.4	80.6	80.4	80.6	81.4	82.2	84.2	85.4	86.2	88.3	89.2	90.1	90.1	86.8	85.8	133.2
315	85.8	82.9	82.1	81.8	82.9	83.6	83.4	84.1	85.1	85.8	86.3	87.9	88.8	88.8	88.4	86.0	85.8	133.2
400	82.0	81.4	81.7	81.5	81.2	82.0	82.4	83.2	85.0	86.4	87.0	88.1	88.7	88.7	88.0	84.4	85.7	133.1
500	83.2	81.7	81.3	81.7	81.5	82.8	83.3	84.5	86.0	87.2	87.5	88.4	88.3	87.7	87.2	83.6	85.9	133.3
630	85.6	83.3	81.8	81.3	81.6	81.8	82.9	84.4	86.3	87.3	88.8	89.2	89.4	87.8	86.4	82.6	86.3	133.7
800	86.3	83.3	81.9	81.9	81.9	82.1	83.3	84.4	86.3	87.1	88.8	89.9	90.3	88.1	86.3	82.5	86.6	134.0
1000	89.3	85.3	83.3	82.0	82.2	82.7	83.7	84.5	87.0	88.0	88.3	89.9	90.7	88.0	85.5	82.2	86.9	134.3
1250	88.0	84.2	83.0	82.0	81.5	82.2	83.4	84.7	87.2	88.5	88.9	89.3	89.5	87.0	84.7	81.1	86.7	134.1
1600	85.6	82.7	81.4	81.1	80.7	81.4	82.2	84.1	86.4	87.4	88.1	88.7	88.7	85.7	83.7	80.0	85.8	133.2
2000	85.3	82.5	81.1	80.5	79.8	80.8	81.1	83.8	86.0	87.0	88.5	88.1	88.6	85.5	83.5	79.4	85.6	133.0
2500	87.4	85.4	83.9	82.9	81.2	81.2	80.4	82.7	84.4	85.6	87.1	88.8	88.4	84.7	82.4	78.5	85.4	132.8
3150	89.9	87.9	87.0	85.0	82.9	82.4	80.0	81.4	83.5	84.4	85.5	88.5	89.9	85.7	82.7	79.1	86.0	133.4
4000	89.4	87.2	85.6	83.9	82.2	80.7	79.2	80.5	82.7	83.5	84.2	85.3	86.7	83.9	81.2	76.6	84.5	131.9
5000	91.6	89.8	87.8	85.8	84.5	82.5	80.0	79.1	81.8	82.3	84.0	83.9	85.1	83.0	81.1	75.7	85.2	132.6
6300	90.9	91.3	90.3	87.9	87.4	84.9	80.6	80.4	82.3	82.1	83.9	85.6	86.6	82.2	80.1	76.4	87.0	134.4
8000	91.2	92.3	91.7	89.5	88.2	86.2	81.7	81.3	85.4	85.2	86.7	88.7	89.7	85.2	82.7	77.6	89.6	137.0
10000	89.5	90.5	90.1	88.3	87.1	85.6	80.7	80.1	83.0	82.7	83.9	84.5	85.4	82.3	80.8	74.8	88.4	135.8
12500	88.9	89.7	89.9	89.1	89.1	87.6	83.0	81.9	85.0	85.4	87.1	86.6	86.2	82.4	81.2	74.3	91.1	138.5
16000	84.8	86.5	86.4	85.0	85.9	84.4	83.0	80.8	84.0	84.7	87.0	86.8	86.8	82.3	80.7	73.8	91.2	138.6
20000	78.0	79.5	80.0	79.2	78.5	77.0	75.6	77.7	81.8	81.7	82.3	82.5	82.5	78.8	76.8	70.4	89.3	136.7
OVERALL	101.2	100.3	99.6	98.1	97.7	97.0	95.8	96.8	98.8	99.7	100.7	101.8	102.6	101.4	101.9	100.1	101.2	148.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	71.5	80.7	85.4	87.4	88.6	89.8	89.7	91.6	93.7	94.6	95.2	95.7	95.3	90.7	86.2	78.3		

TABLE XIII. - NOISE OF QF-3 CONFIGURATION 41 - SUPPRESSOR A, FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST, NO FOAM

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(a) 60 Percent speed; fan physical speed, 2138 rpm; fundamental blade passage frequency, 1888 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	66.0	66.7	67.2	66.9	66.7	66.7	66.9	68.4	67.2	68.7	68.7	69.9	70.5	72.4	73.2	73.7	69.2	116.6
63	68.7	68.0	66.0	67.4	66.5	65.9	67.0	66.9	66.7	67.5	68.2	69.1	71.0	71.7	73.7	74.6	69.0	116.4
80	71.9	70.9	67.4	70.2	67.4	66.9	68.7	68.0	68.4	68.5	70.0	71.1	73.2	74.4	75.9	75.9	70.9	118.3
100	69.4	67.9	67.7	69.2	69.2	68.7	68.1	68.9	69.7	71.1	72.1	74.3	75.7	76.7	77.1	76.9	72.5	119.9
125	71.1	70.3	70.4	70.1	69.6	70.3	70.6	71.1	72.1	73.6	74.1	75.2	75.8	75.8	76.6	76.3	73.3	120.7
160	73.1	72.2	72.7	71.7	71.6	72.4	71.9	71.9	73.1	73.1	73.4	74.2	74.1	74.2	74.2	73.3	73.0	120.4
200	73.8	76.3	72.5	74.0	72.8	71.3	70.3	70.5	72.1	70.8	71.5	72.2	73.3	73.5	74.0	72.2	72.4	119.8
250	73.6	73.6	72.4	71.7	70.6	69.4	69.6	70.9	71.9	72.6	74.1	74.8	75.2	74.9	74.1	72.4	72.8	120.2
315	75.4	73.9	73.7	72.9	72.7	72.6	72.6	72.4	72.6	73.2	74.1	74.3	74.9	74.2	73.6	71.5	73.4	120.8
400	77.5	75.9	73.7	72.7	72.2	71.4	71.2	71.7	73.0	73.9	75.5	75.5	76.4	75.2	73.7	70.6	74.0	121.4
500	77.7	75.8	74.3	74.0	72.8	72.3	72.3	72.8	74.2	75.2	75.7	76.4	76.2	75.3	73.5	70.6	74.6	122.0
630	77.7	76.2	75.2	74.2	73.2	72.0	71.5	72.5	74.0	75.2	76.7	77.1	77.7	76.7	73.5	70.1	75.1	122.5
800	79.1	77.8	76.4	74.8	73.4	71.9	71.9	72.4	74.1	75.3	77.1	77.9	79.3	78.8	73.8	70.5	75.9	123.3
1000	79.6	76.3	74.6	73.3	72.5	71.3	71.6	71.6	73.8	74.8	75.8	76.6	78.8	78.8	74.0	70.7	75.2	122.6
1250	76.8	74.4	73.6	71.9	70.8	70.4	70.1	70.4	72.1	74.1	75.6	76.2	76.6	76.9	72.9	69.0	74.0	121.4
1600	78.9	78.4	76.8	75.1	73.3	71.3	69.9	69.4	71.1	72.8	74.4	74.4	75.1	74.9	71.8	68.7	73.9	121.3
2000	83.2	86.1	82.4	79.7	78.1	74.2	71.9	72.6	73.1	73.1	74.7	75.0	77.1	76.7	72.9	71.6	77.6	125.0
2500	76.6	75.9	74.7	72.9	70.9	68.6	66.4	67.1	69.2	70.4	72.1	72.0	72.9	72.2	68.4	65.5	71.7	119.1
3150	80.9	80.7	79.0	76.5	74.2	70.5	67.3	67.7	69.3	70.8	71.5	72.3	72.3	72.3	69.0	66.4	74.1	121.5
4000	86.5	87.0	85.3	83.0	80.2	75.8	71.2	69.6	71.1	72.1	73.1	73.6	76.0	75.6	72.8	70.1	79.4	126.8
5000	86.2	85.7	84.0	81.7	79.8	76.2	72.3	69.7	71.7	72.3	73.5	73.6	76.2	75.5	73.3	68.8	79.0	126.4
6300	88.2	88.7	87.7	85.4	84.9	80.2	73.9	72.7	74.6	74.7	76.6	79.1	81.4	77.2	74.9	71.5	83.1	130.5
8000	87.7	89.2	88.9	87.1	85.4	81.8	74.9	74.8	79.4	79.4	80.7	82.7	84.6	81.4	77.9	72.9	85.5	132.9
10000	88.3	85.8	89.9	89.1	85.1	88.3	80.0	78.8	81.8	81.3	82.6	83.3	84.4	80.9	78.6	73.4	88.6	136.0
12500	88.7	88.5	88.5	87.7	88.3	87.1	79.5	77.3	82.1	83.5	85.0	85.4	86.0	83.0	81.7	73.9	89.7	137.1
16000	79.0	79.8	79.1	78.0	77.6	74.7	68.4	70.4	74.9	77.4	79.4	80.2	81.5	78.5	76.9	69.9	84.0	131.4
20000	73.2	74.0	73.5	71.8	69.8	65.9	60.8	64.0	69.9	71.3	72.8	73.8	74.8	71.8	69.8	63.1	80.3	127.7
OVERALL	96.7	97.2	96.4	95.0	94.4	92.5	86.9	86.4	89.0	89.8	91.1	91.9	93.1	91.3	89.4	86.6	95.0	142.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	65.3	76.8	80.4	82.2	82.7	81.3	79.2	79.8	81.3	81.7	82.5	82.2	82.3	79.5	73.5	66.4		

TABLE XIII. - Continued. NOISE OF QF-3 CONFIGURATION 41 - SUPPRESSOR A,

FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST, NO FOAM

[Data adjusted to standard day of 15° C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(b) 70 Percent speed; fan physical speed, 2490 rpm; fundamental blade passage frequency, 2199 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	71.7	68.9	70.6	70.7	70.4	71.4	71.1	71.4	72.1	72.7	73.7	74.5	75.9	76.7	78.1	79.8	73.8	121.2
63	67.7	69.7	69.1	68.9	68.9	68.9	69.9	69.4	69.9	70.9	72.2	73.3	76.1	76.6	79.1	79.3	73.1	120.5
80	74.9	73.1	78.1	69.3	71.6	69.8	68.3	69.3	71.3	73.8	74.1	75.9	78.6	79.1	81.6	81.7	75.6	123.0
100	70.5	69.7	70.7	69.8	69.8	70.7	71.2	72.5	74.0	75.8	77.7	78.9	80.3	81.2	83.5	82.7	77.2	124.6
125	74.1	73.4	75.1	73.9	73.9	77.1	77.9	76.7	76.6	77.9	79.4	80.0	80.9	81.6	83.2	82.1	78.7	126.1
160	75.6	74.9	75.4	74.9	75.6	75.1	76.6	77.1	77.1	77.4	77.1	78.8	78.6	79.4	79.4	78.8	77.3	124.7
200	75.5	75.5	74.6	74.0	74.3	73.3	73.6	73.6	75.0	74.3	74.8	76.2	77.6	78.3	79.6	77.8	75.6	123.0
250	77.6	76.9	75.1	74.9	75.3	73.1	73.8	74.3	76.3	77.4	77.9	79.4	79.8	79.8	80.1	77.7	77.2	124.6
315	77.2	76.7	75.5	75.8	75.7	76.0	76.5	76.7	76.7	77.2	77.8	78.9	79.2	79.2	78.5	76.2	77.3	124.7
400	78.9	77.5	76.2	75.0	75.2	75.0	75.0	75.9	76.7	78.0	78.7	79.6	80.0	79.5	78.2	75.4	77.6	125.0
500	80.4	78.3	76.9	76.3	76.1	76.1	76.1	77.1	78.1	78.6	79.6	80.0	79.8	79.3	77.6	74.8	78.2	125.6
630	80.1	77.9	76.9	75.9	75.7	76.2	75.6	76.4	77.7	78.7	80.2	80.8	80.5	79.7	77.7	73.8	78.4	125.8
800	81.7	79.3	77.3	76.2	76.2	75.3	75.5	76.5	77.7	79.3	80.5	81.4	82.3	81.5	77.7	74.2	79.0	126.4
1000	83.9	79.4	77.4	76.4	76.0	75.7	76.0	76.2	78.0	79.0	79.9	80.5	82.4	82.2	77.4	74.3	79.0	126.4
1250	79.4	77.2	75.9	74.6	74.4	74.4	74.2	75.1	76.7	78.6	80.1	80.7	80.7	81.2	76.6	72.6	78.1	125.5
1600	80.1	78.0	77.1	76.0	74.8	73.8	73.1	73.8	75.8	77.6	79.0	78.9	79.8	79.6	74.8	71.5	77.2	124.6
2000	85.3	83.6	82.4	80.8	76.9	75.8	73.6	74.3	76.6	77.8	78.8	79.4	82.6	80.9	75.8	73.2	79.4	126.8
2500	82.3	80.8	80.0	78.5	75.1	73.6	71.6	72.8	74.8	75.5	77.5	77.7	80.3	79.3	74.1	71.0	77.4	124.8
3150	82.4	82.4	80.2	77.8	75.8	73.8	70.8	71.9	73.9	74.7	75.6	76.5	77.7	76.2	72.6	69.7	76.8	124.2
4000	88.9	88.2	86.9	83.9	81.2	78.5	73.7	72.9	74.9	75.7	76.9	77.5	79.5	78.7	74.9	72.1	81.3	128.7
5000	88.8	88.0	86.7	84.3	82.7	79.2	75.0	72.3	74.6	75.3	76.5	76.8	79.2	78.6	76.0	71.6	81.7	129.1
6300	90.1	90.8	90.4	87.8	87.4	83.9	77.1	75.8	76.4	77.1	78.8	81.1	83.3	78.8	75.9	73.5	85.5	132.9
8000	89.8	90.6	90.4	88.4	86.8	84.6	77.6	76.5	79.5	80.0	81.6	83.8	85.9	82.1	78.6	74.1	86.9	134.3
10000	88.8	89.5	90.1	88.3	87.8	86.9	79.2	78.2	80.2	80.2	81.7	82.2	83.5	80.1	77.5	72.6	87.8	135.2
12500	90.8	91.2	91.3	90.7	91.7	91.2	84.0	80.5	83.5	84.8	86.7	86.0	86.8	83.3	81.2	74.4	92.3	139.7
16000	82.6	83.4	83.1	81.4	81.7	79.8	73.9	75.9	79.7	82.1	84.1	84.2	85.2	81.2	79.0	72.3	88.1	135.5
20000	77.3	77.8	77.6	75.8	74.4	72.0	67.2	69.9	75.0	76.6	77.2	78.3	79.6	76.3	73.4	66.5	84.9	132.3
OVERALL	98.8	98.7	98.3	96.6	96.2	95.0	90.2	89.7	91.5	92.6	93.9	94.6	95.8	94.3	93.0	91.1	97.4	144.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	67.7	77.2	82.3	83.8	84.5	84.3	82.4	83.0	84.9	85.8	86.4	86.2	86.8	83.6	77.3	69.9		

TABLE XIII. - Continued. NOISE OF QF-3 CONFIGURATION 41 - SUPPRESSOR A,

FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST, NO FOAM

[Data adjusted to standard day of 15^{0} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^{2}; PWL referenced to 10^{-13} W.]

(c) 80 Percent speed; fan physical speed, 2848 rpm; fundamental blade passage frequency, 2515 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	82.2	76.4	78.4	80.6	76.7	78.9	80.4	78.7	80.2	79.2	81.6	79.5	81.4	81.1	83.9	84.3	80.4	127.8
63	71.3	73.6	72.1	72.8	72.9	73.1	72.6	73.6	75.1	75.3	76.1	78.0	80.6	81.1	83.9	84.3	77.6	125.0
80	74.1	73.1	72.6	71.9	71.7	71.9	72.1	73.1	74.9	76.4	78.2	81.2	82.9	84.6	86.1	87.1	79.7	127.1
100	81.3	79.9	81.8	76.1	73.8	74.3	76.1	77.6	79.1	80.5	81.6	83.7	85.4	86.6	88.3	87.3	82.3	129.7
125	77.8	75.8	77.0	76.5	77.1	78.0	78.6	79.8	80.8	82.3	83.5	84.6	85.5	86.5	88.6	86.4	82.8	130.2
160	78.4	78.4	79.7	78.7	79.9	80.4	79.7	80.4	81.6	81.6	83.2	83.7	83.4	84.9	85.4	82.6	82.0	129.4
200	79.3	79.1	78.8	78.3	78.8	77.6	78.3	78.5	78.5	78.6	79.6	81.4	82.6	83.6	84.6	82.4	80.3	127.7
250	80.3	79.7	78.0	77.5	78.7	77.3	77.3	78.3	80.3	81.5	82.5	83.8	84.2	84.7	84.7	82.4	81.4	128.8
315	80.7	80.0	78.8	78.8	79.8	79.7	79.7	80.5	81.2	81.5	82.2	83.6	84.0	83.8	83.8	81.0	81.6	129.0
400	80.8	79.8	79.9	78.4	78.1	78.4	78.6	79.6	80.8	82.1	82.9	83.9	84.1	84.3	83.3	80.2	81.6	129.0
500	82.7	81.1	79.9	79.2	79.2	79.6	80.1	80.7	82.4	83.1	83.4	84.0	84.2	83.2	82.6	79.3	82.1	129.5
630	82.3	81.3	79.6	79.5	78.8	79.1	80.0	80.6	82.1	83.3	84.5	85.4	85.1	83.6	82.1	78.2	82.5	129.9
800	83.1	80.6	79.9	78.9	79.1	79.1	79.6	80.2	81.6	83.4	84.6	85.7	86.2	84.6	81.7	78.3	82.7	130.1
1000	85.3	82.1	80.5	79.8	79.1	79.1	80.0	80.5	82.5	84.1	84.3	85.4	86.5	85.1	81.1	77.9	83.0	130.4
1250	83.6	80.5	79.6	79.0	79.0	79.0	79.3	80.5	82.3	84.1	85.1	85.6	85.3	84.5	80.8	76.8	82.8	130.2
1600	82.7	80.0	79.0	78.8	78.0	77.7	77.7	79.5	81.5	83.3	84.2	84.3	84.7	82.7	79.5	76.2	81.8	129.2
2000	83.9	80.9	79.3	78.8	77.4	76.8	76.9	78.9	81.3	82.4	83.6	83.4	84.1	82.3	79.1	76.0	81.4	128.8
2500	85.7	84.7	83.7	83.7	81.3	79.2	75.8	78.8	80.8	81.3	83.0	84.9	87.2	83.8	79.7	76.2	83.0	130.4
3150	85.0	83.5	81.9	79.7	78.2	76.2	74.7	76.5	78.7	80.0	80.5	81.8	82.7	80.0	77.2	73.7	80.4	127.8
4000	88.9	87.4	85.7	83.4	80.7	78.2	75.7	76.2	78.7	79.5	80.4	81.0	82.4	80.4	77.7	74.1	82.0	129.4
5000	91.3	90.3	90.3	88.5	86.8	83.3	79.5	76.8	79.3	79.5	81.1	81.6	83.6	82.0	80.0	75.2	85.4	132.8
6300	89.9	91.0	89.5	87.7	86.7	83.4	77.9	77.9	79.4	79.9	81.0	83.2	84.6	79.7	77.7	74.3	85.7	133.1
8000	91.6	92.9	92.3	91.0	89.1	86.8	80.6	79.8	82.8	83.1	84.8	87.1	88.8	84.1	81.8	77.2	89.4	136.8
10000	90.4	91.4	90.9	89.2	88.1	86.7	80.0	79.0	81.5	81.0	82.0	83.2	84.0	80.4	78.9	73.9	88.5	135.9
12500	90.5	91.1	91.3	90.8	90.9	90.2	84.6	82.3	84.8	85.7	87.3	86.9	86.8	83.3	81.7	74.5	92.3	139.7
16000	83.8	85.3	85.2	84.2	84.7	83.1	78.3	80.3	83.2	85.0	86.7	87.0	87.4	82.5	81.0	74.2	90.8	138.2
20000	78.1	79.2	79.2	78.8	77.0	75.4	72.9	75.4	79.5	80.9	81.4	81.9	82.3	78.7	76.9	69.9	88.3	135.7
OVERALL	100.1	100.0	99.4	98.2	97.3	96.0	93.2	93.4	95.3	96.3	97.5	98.4	99.2	97.8	97.4	95.4	99.5	146.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	69.2	78.7	83.4	86.0	87.2	87.0	86.1	87.7	89.8	90.5	91.2	91.6	91.6	87.5	82.1	74.1		

TABLE XIII. - Concluded. NOISE OF QF-3 CONFIGURATION 41 - SUPPRESSOR A,

FULLY ACTIVE INLET, FULLY ACTIVE EXHAUST, NO FOAM

[Data adjusted to standard day of 15^{0} C and 70 percent relative humidity. SPL referenced to 2×10^{-5} N/m^2; PWL referenced to 10^{-13} W.]

(d) 90 Percent speed; fan physical speed, 3204 rpm; fundamental blade passage frequency, 2830 hertz

FREQUENCY	ANGLE, DEG																AVERAGE SPL	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS																	
50	82.9	78.6	81.4	78.7	78.4	79.2	79.6	80.2	80.1	81.9	81.6	83.0	84.4	85.2	88.4	89.0	82.7	130.1
63	75.5	77.5	76.7	76.2	76.7	76.8	76.8	78.0	78.0	78.8	80.5	81.9	84.0	85.7	87.8	88.7	81.6	129.0
80	76.9	75.7	75.0	74.9	75.9	75.7	75.7	77.0	77.9	79.9	82.4	84.3	86.5	89.0	91.9	91.7	84.1	131.5
100	85.2	79.8	79.8	80.3	80.3	79.5	79.3	81.5	83.3	84.3	86.2	88.3	89.7	91.7	93.5	93.1	86.9	134.3
125	81.8	80.2	80.8	80.2	80.5	81.3	82.5	83.7	85.3	86.5	88.0	88.8	89.8	92.3	93.5	91.6	87.4	134.8
160	82.9	82.9	83.0	82.4	83.0	84.7	84.2	85.2	85.7	85.5	86.7	88.6	88.5	88.9	90.5	87.9	86.4	133.8
200	82.4	83.2	82.2	81.9	82.0	82.0	82.2	82.2	82.7	82.9	83.7	85.8	87.9	88.9	89.9	86.6	84.8	132.2
250	82.5	82.7	82.4	80.9	80.9	81.0	81.9	82.9	84.7	85.7	86.5	88.1	89.2	89.9	90.0	86.9	85.9	133.3
315	86.3	83.8	82.6	82.6	84.3	85.6	83.8	84.4	85.1	85.6	86.4	87.5	88.4	88.8	88.8	85.8	85.9	133.3
400	83.0	82.0	82.2	82.3	83.5	83.0	82.7	83.7	85.2	86.3	87.3	88.3	88.7	88.5	87.7	84.7	85.9	133.3
500	84.2	83.2	83.2	82.4	83.4	83.0	84.2	84.9	86.4	86.9	87.7	87.9	88.4	87.9	87.2	83.7	86.1	133.5
630	86.0	84.2	82.8	82.8	82.5	82.8	83.5	84.7	86.2	87.3	89.0	89.1	89.2	88.0	86.7	82.9	86.5	133.9
800	86.4	83.6	82.8	82.4	82.9	82.9	83.6	84.8	86.3	87.4	88.8	90.0	90.3	88.3	86.6	83.0	86.8	134.2
1000	88.7	85.2	84.2	82.9	83.1	83.6	84.4	85.1	87.1	88.2	88.4	89.5	90.4	87.9	85.9	82.1	87.0	134.4
1250	87.5	84.2	83.7	82.5	83.2	83.0	83.7	85.0	87.2	88.5	88.7	89.1	89.7	87.0	85.0	80.9	86.8	134.2
1600	85.8	83.1	82.8	82.1	82.3	82.1	82.4	84.3	86.4	88.3	88.3	88.4	89.0	85.8	84.1	80.2	86.1	133.5
2000	85.2	82.7	81.9	80.9	81.0	81.2	81.5	84.0	85.7	87.2	88.4	87.8	88.9	85.5	83.5	79.4	85.7	133.1
2500	87.7	85.9	85.6	84.1	82.2	81.4	81.1	83.1	84.6	85.6	87.6	89.0	88.7	84.9	82.4	79.3	85.8	133.2
3150	89.9	88.7	87.9	86.4	83.5	82.7	81.0	82.3	83.5	84.5	86.2	89.0	89.5	86.0	83.2	80.1	86.4	133.8
4000	89.8	88.0	87.1	85.1	82.8	81.3	80.1	80.6	82.6	83.6	84.8	85.2	86.8	83.6	81.4	77.2	84.9	132.3
5000	91.9	90.6	88.4	86.9	85.1	82.9	80.6	79.7	82.1	82.9	84.2	84.2	85.2	83.1	81.2	76.5	85.7	133.1
6300	91.5	91.7	90.7	88.7	88.2	85.3	80.8	81.2	82.5	82.7	84.5	86.3	86.7	82.2	80.3	76.9	87.5	134.9
8000	91.6	92.9	91.9	89.7	88.4	86.2	82.2	82.4	85.4	85.9	87.7	89.2	89.9	85.6	83.2	78.2	90.0	137.4
10000	90.3	90.9	90.6	88.5	87.6	86.1	81.4	81.0	83.2	83.4	84.5	85.1	85.8	82.6	81.3	75.6	88.9	136.3
12500	89.8	90.1	90.3	89.5	89.8	88.3	84.2	82.8	85.8	87.0	88.6	87.7	87.4	83.6	82.6	75.5	92.0	139.4
16000	85.6	87.1	87.0	85.4	86.4	85.0	80.9	82.3	84.4	86.5	87.9	88.1	87.3	83.2	82.1	75.5	92.1	139.5
20000	79.0	80.3	80.7	79.7	79.2	78.3	77.0	78.8	82.8	83.5	84.0	83.8	83.5	80.4	78.8	72.1	90.6	138.0
OVERALL	101.6	100.9	100.2	98.8	98.4	97.5	96.4	97.2	98.9	100.0	101.1	102.0	102.6	101.7	102.0	100.1	101.7	149.1
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS																	
152.5 METERS	71.8	81.5	86.3	88.5	89.4	90.2	90.3	92.1	93.8	94.7	95.6	95.9	95.2	90.9	86.4	78.5		

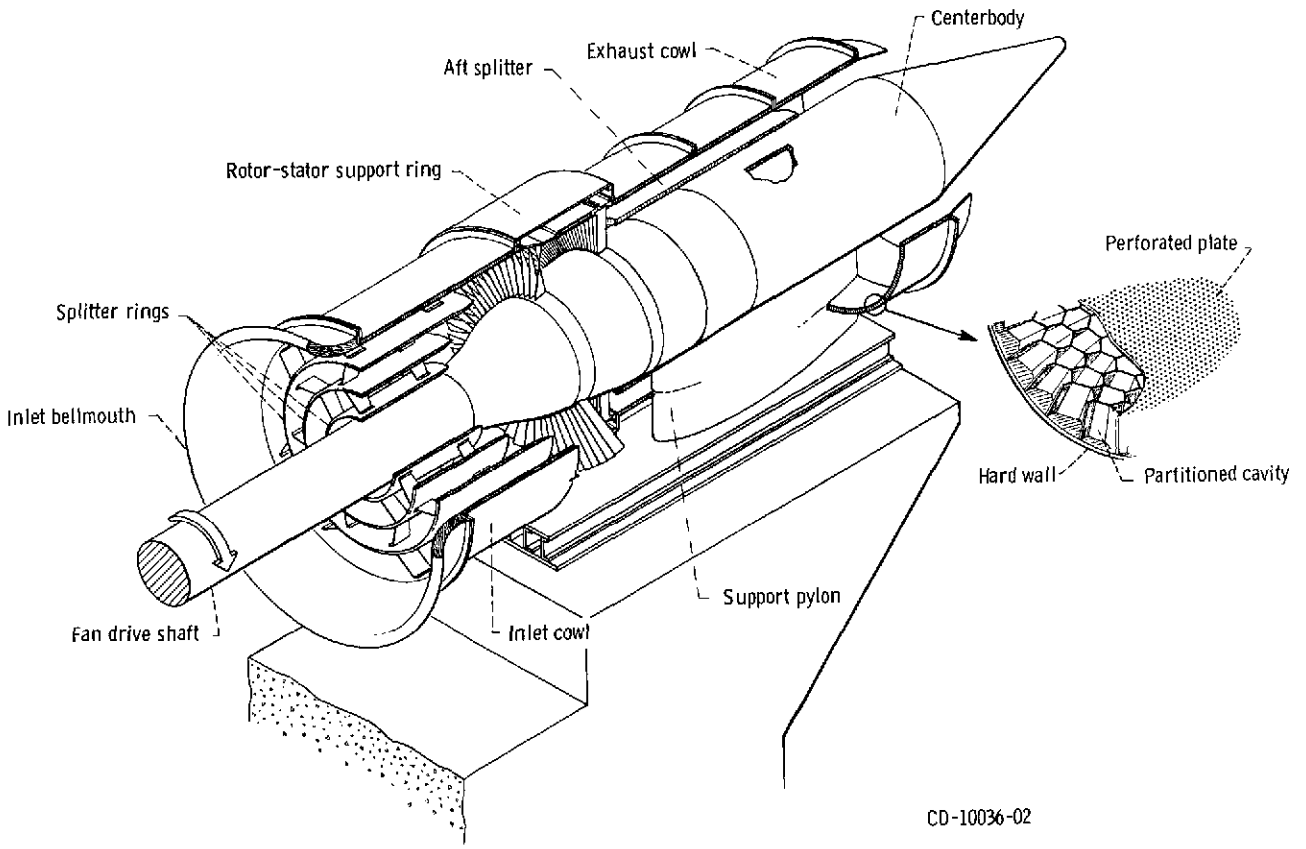
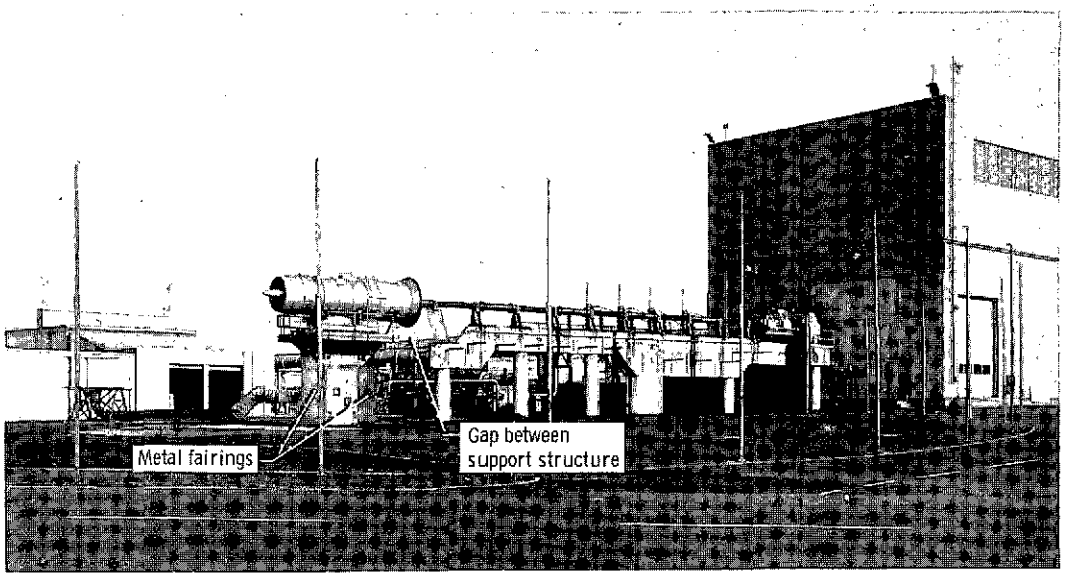
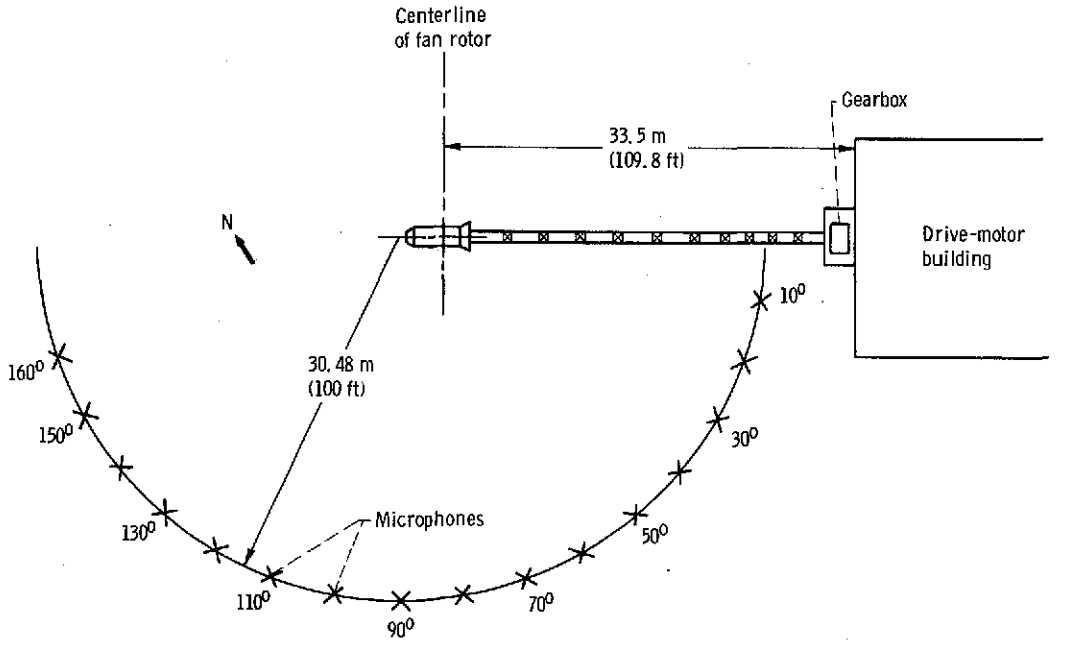


Figure 1. - Cutaway view of fan and suppressor assembly.

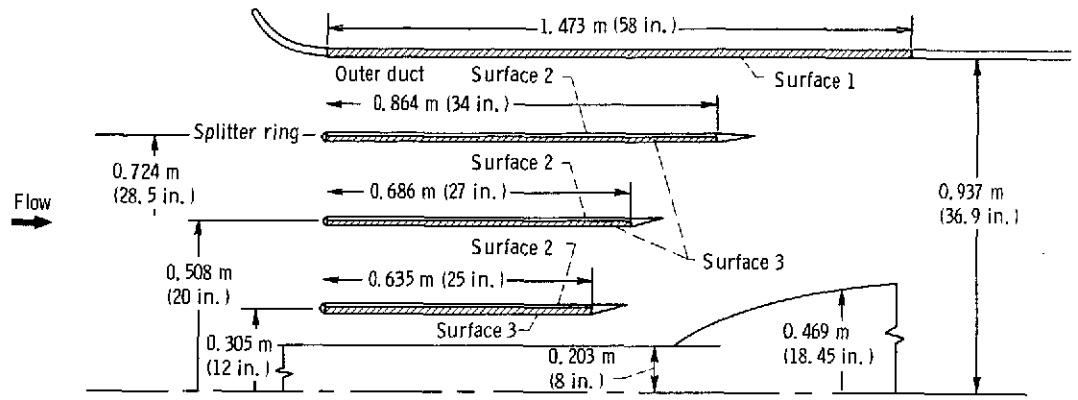


(a) Photograph of test site.



(b) Plan view of test site.

Figure 2. - Full-scale fan test facility.



Surface	Open area, percent	Perforated plate hole diameter		Honeycomb backing depth		Predicted frequency of maximum noise attenuation, Hz
		mm	in.	cm	in.	
Inlet suppressor A						
1	8	1.27	0.050	2.24	0.88	1250
2	3.87	1.27	.050	.51	.20	3150
3	8	1.27	.050	1.73	.68	1600
Inlet suppressor B						
1	2.5	0.81	0.032	2.24	0.88	1250
2	2.5	.81	.032	.51	.20	3150
3	2.5	.81	.032	1.73	.68	1600

Figure 3. - Inlet suppressors. Perforated plate sheet; thickness, 0.51 millimeter (0.020 in.); material, aluminum. Honeycomb cell size, 0.95 centimeter (3/8 in.) hexagon.

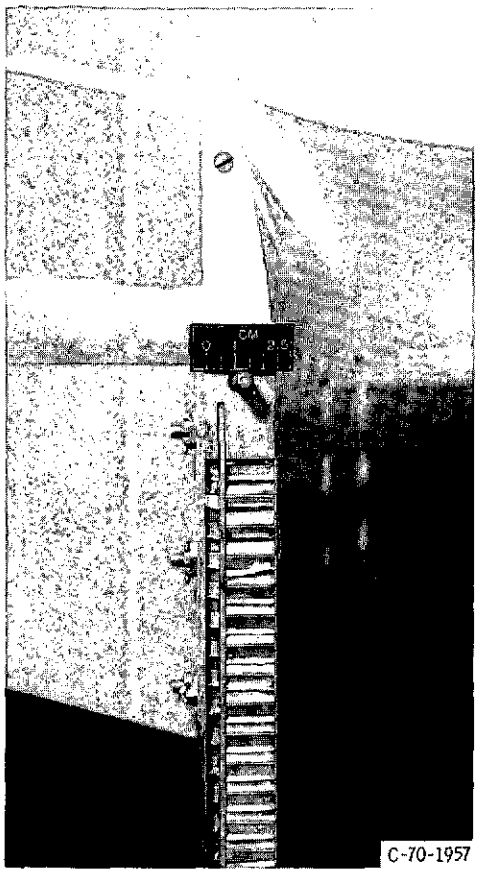


Figure 4. - Splitter cross section showing the two treatment depths.

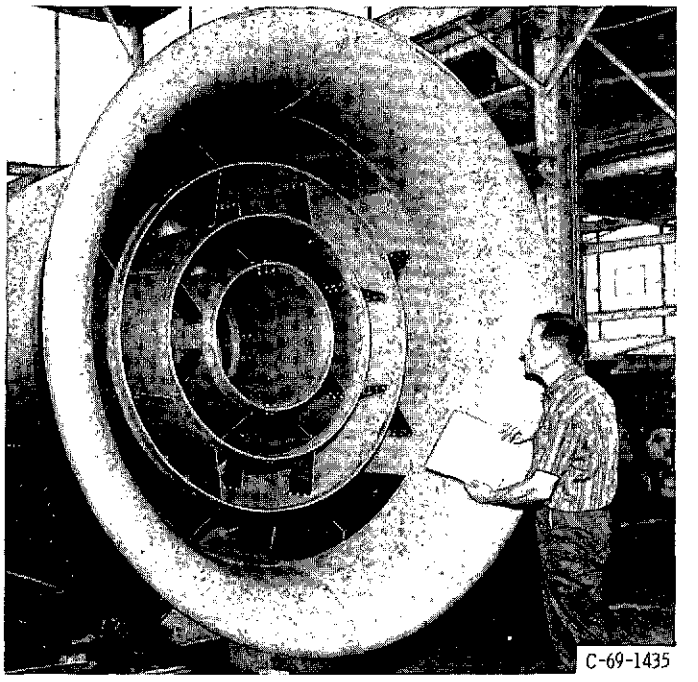
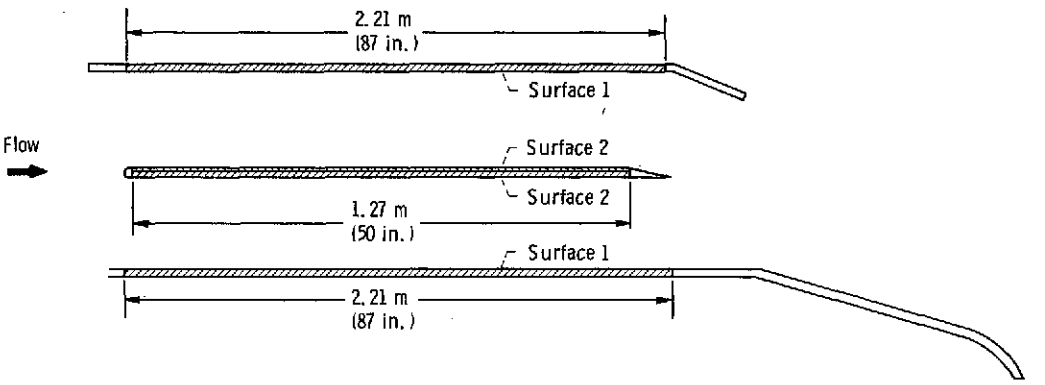


Figure 5. - Inlet suppressor B.



Surface	Open area, percent	Perforated plate hole diameter		Honeycomb backing depth	
		mm	in.	cm	in.
1	8	1.27	0.050	2.24	0.88
2	6.3	3.17	.125	.800	.315

Figure 6. - Exhaust suppressor. Perforated plate sheet: thickness, 0.51 millimeter (0.02 in.); material, aluminum. Honeycomb cell size, 0.95-centimeter (3/8-in.) hexagons.

Position	X	
	cm	in.
1	3.40	1.34
2	10.59	4.17
3	18.46	7.27
4	27.25	10.73
5	37.41	14.73
6	49.86	19.63

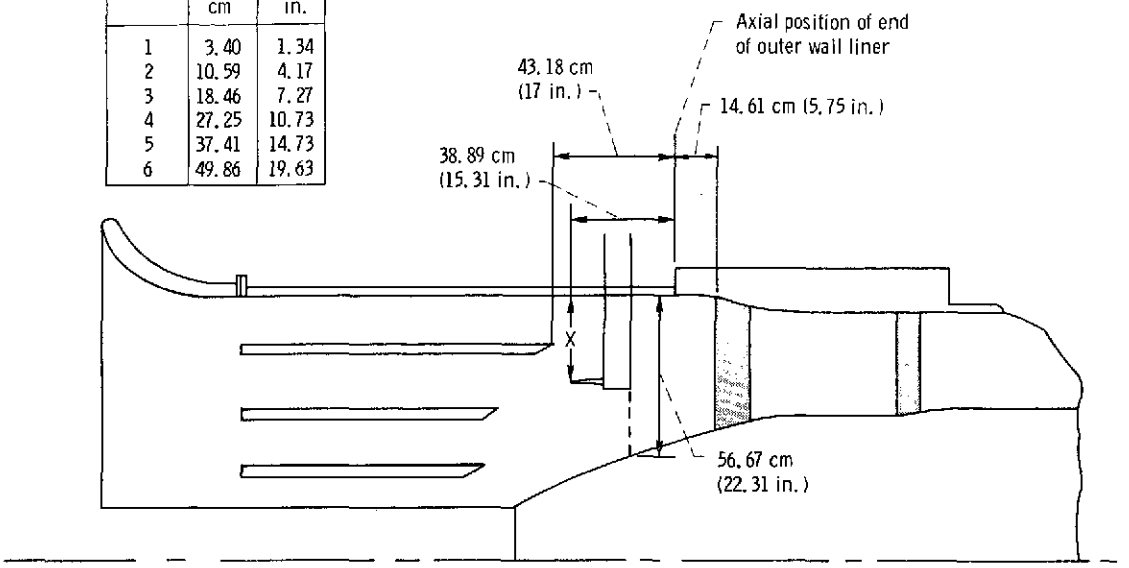


Figure 7. - Inlet microphone probe.

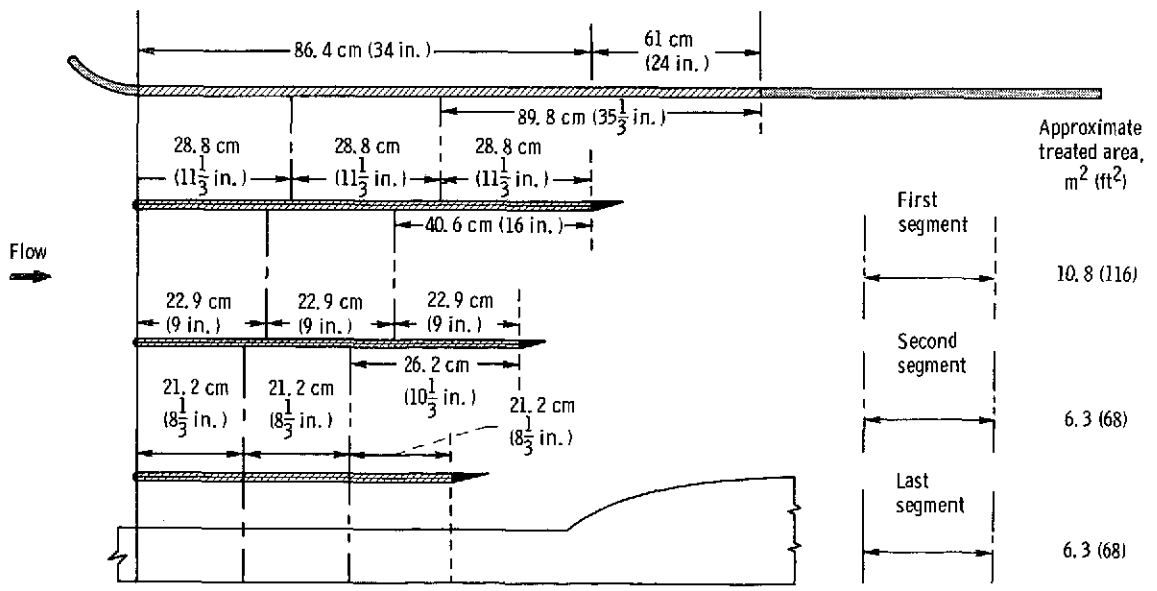
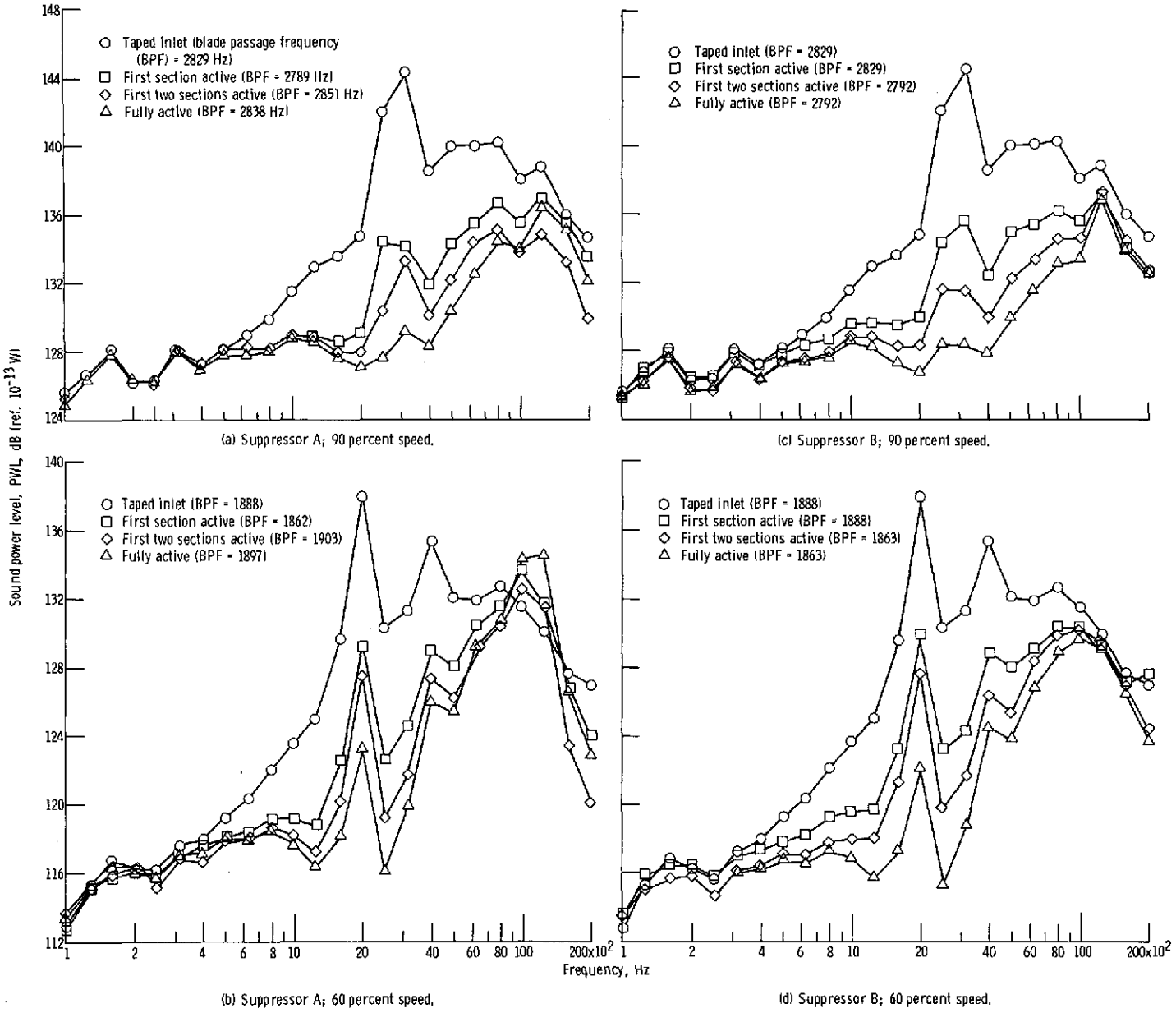


Figure 8. - Suppressor length variation. (Not to scale.)



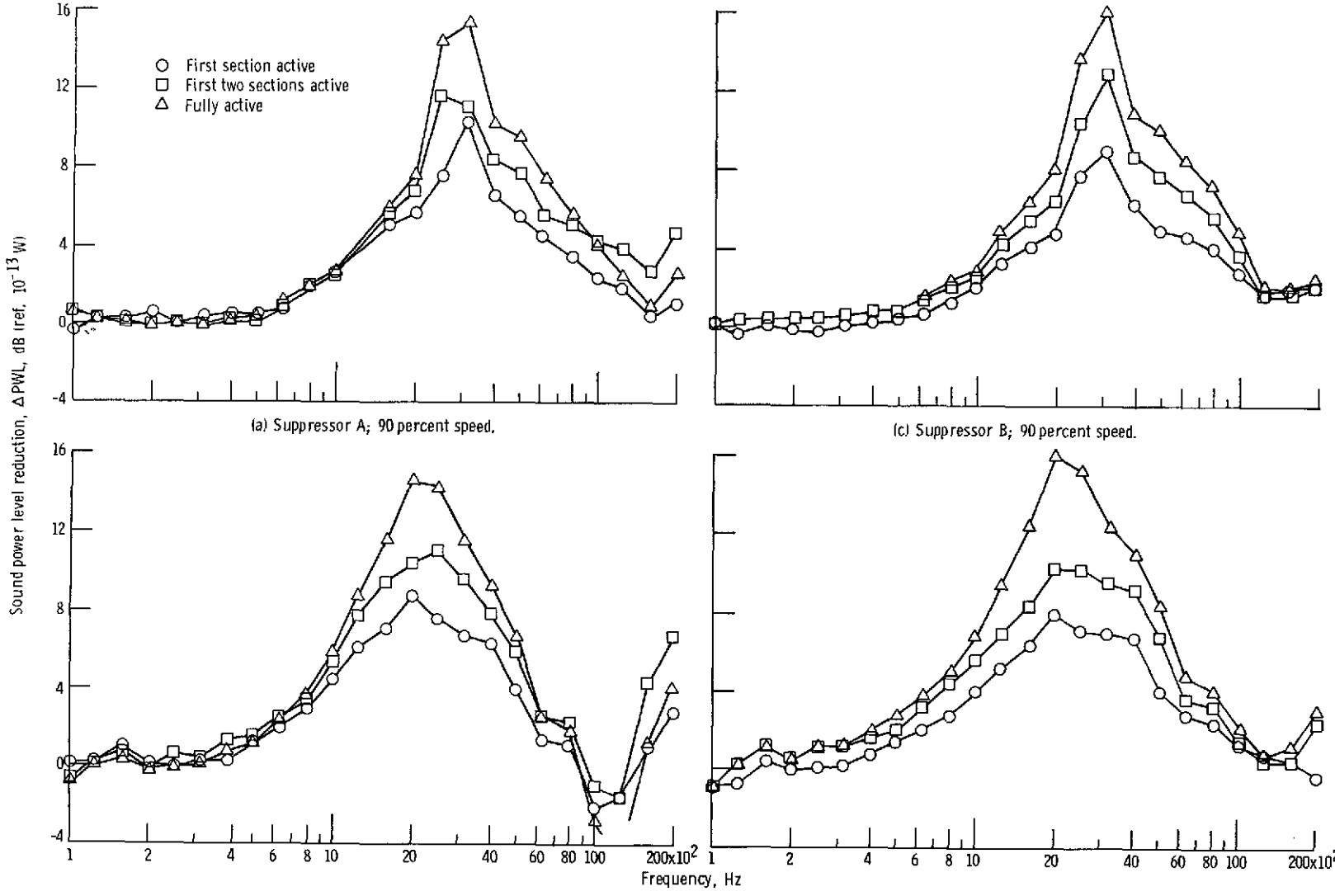
(a) Suppressor A; 90 percent speed.

(c) Suppressor B; 90 percent speed.

(b) Suppressor A; 60 percent speed.

(d) Suppressor B; 60 percent speed.

Figure 9. - Inlet hemisphere sound power level spectra for suppressor A.



(a) Suppressor A; 90 percent speed.

(c) Suppressor B; 90 percent speed.

(b) Suppressor A; 60 percent speed.

(d) Suppressor B; 60 percent speed.

Figure 10. - Variation of inlet hemisphere sound power level attenuation spectra with treated length.

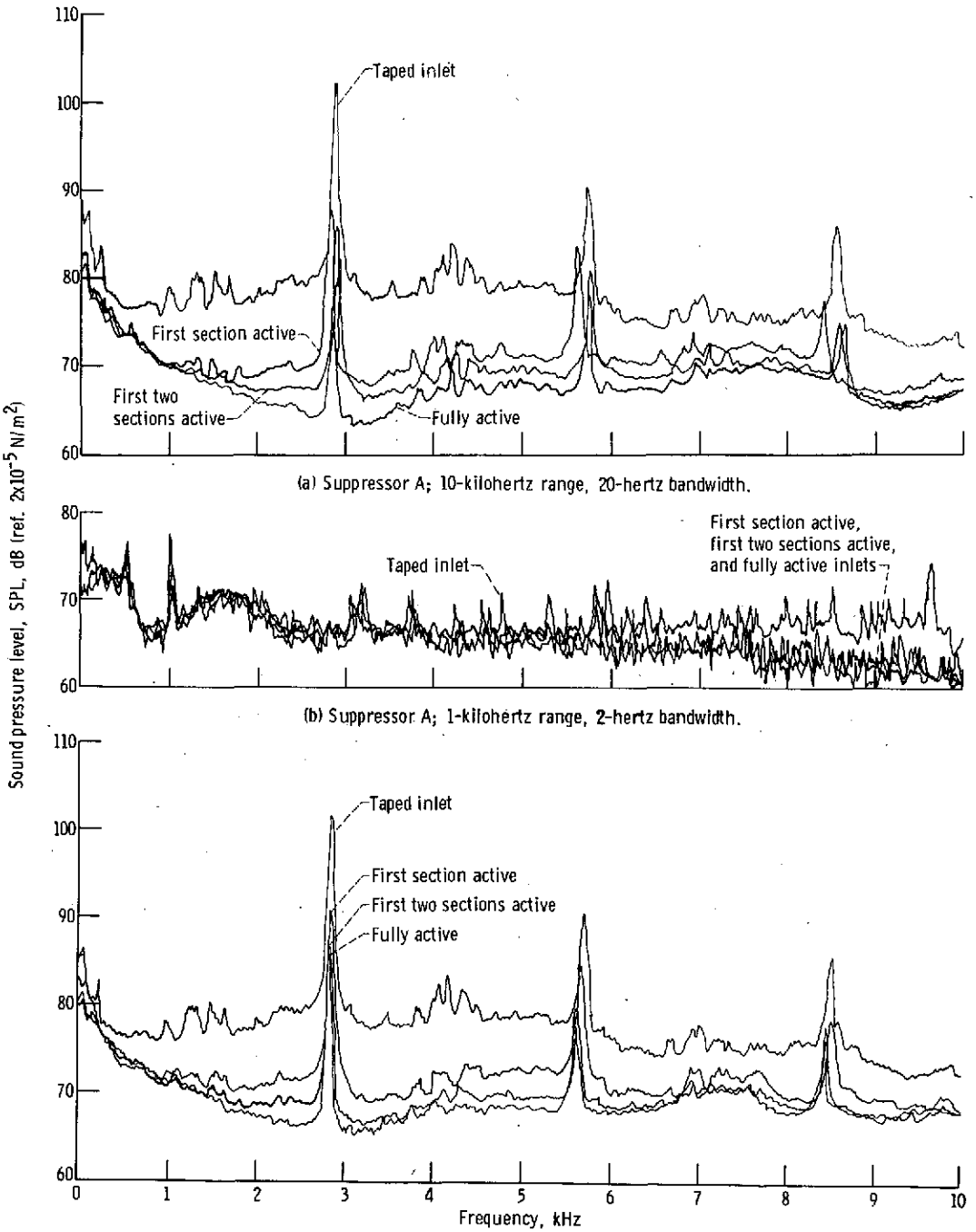
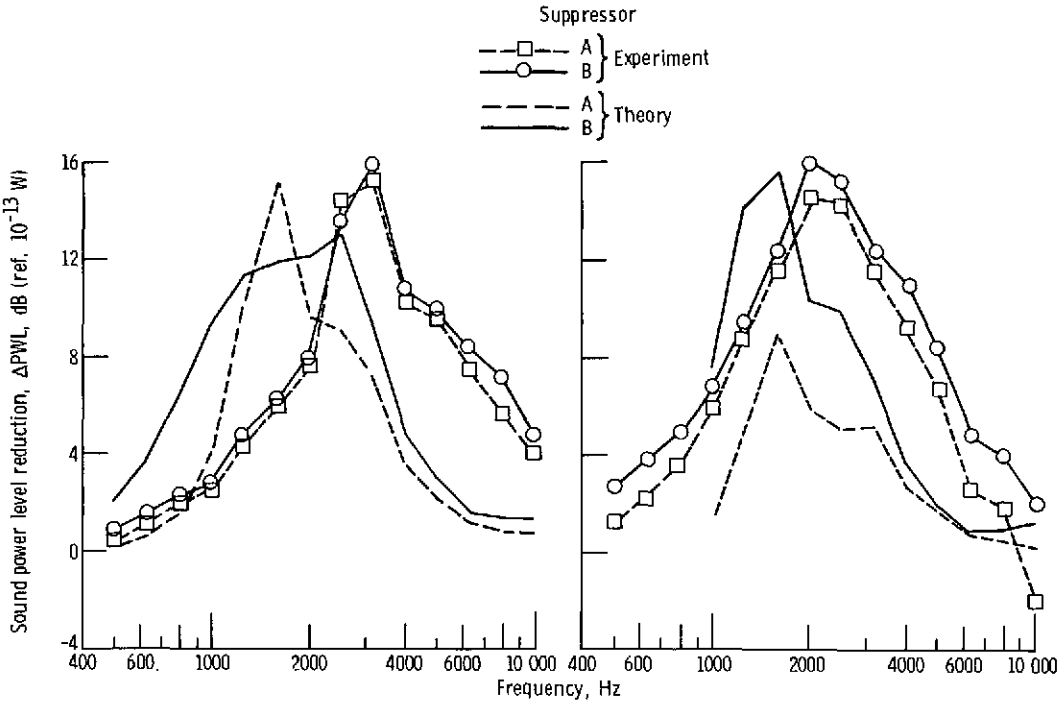
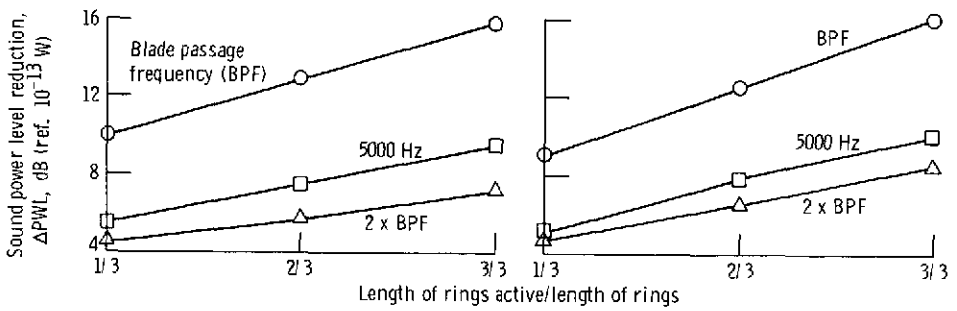


Figure 11. - Narrow band spectra. Microphone location, 40°; radius, 30.5 meters (100 ft); 90 percent speed.



(a) 90 Percent speed. (b) 60 Percent speed.

Figure 12. - Comparison of inlet hemisphere sound power level attenuation with theory.



(a) Suppressor A; 90 percent speed. (b) Suppressor B; 90 percent speed.

Figure 13. - Variation of inlet hemisphere sound power level reduction with fraction of ring treatment length active.

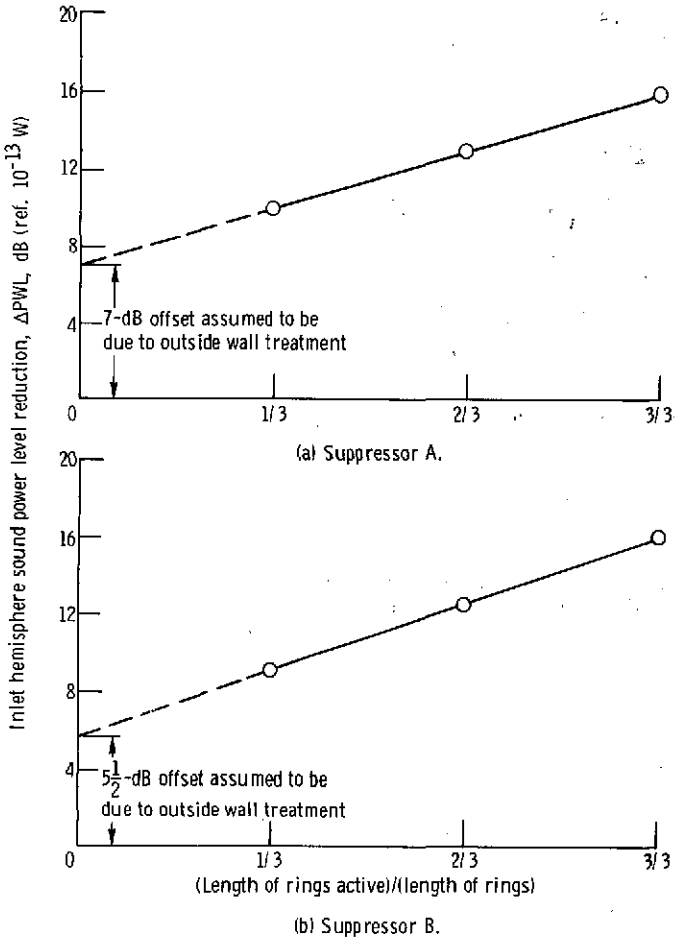


Figure 14. - Extrapolation of blade passage frequency attenuation from ring section of liner to obtain attenuation attributed to outside wall treatment.

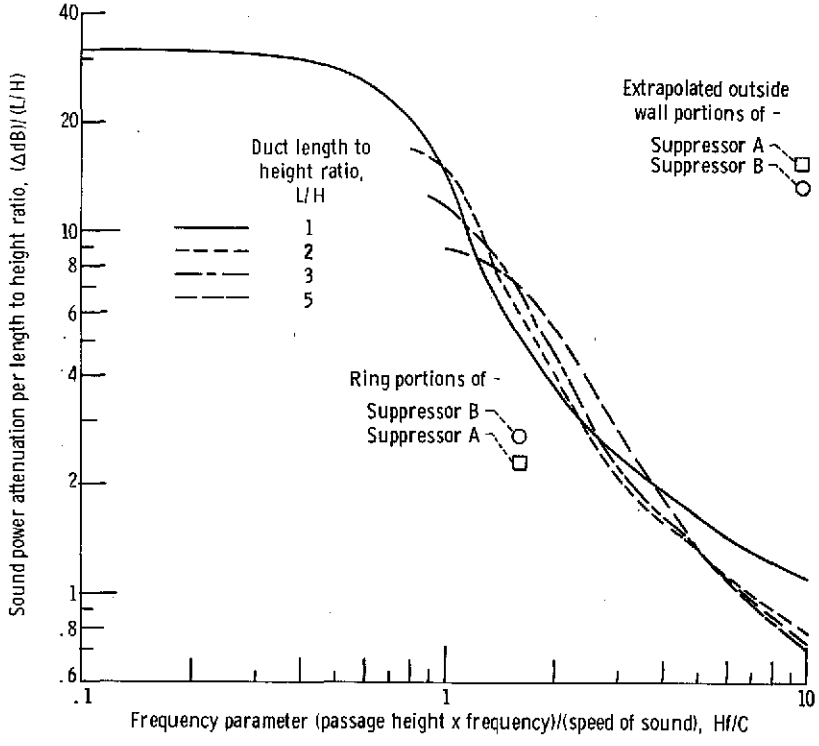


Figure 15. - Comparisons of sound power attenuations per passage length over height ratio with theoretical maximums.

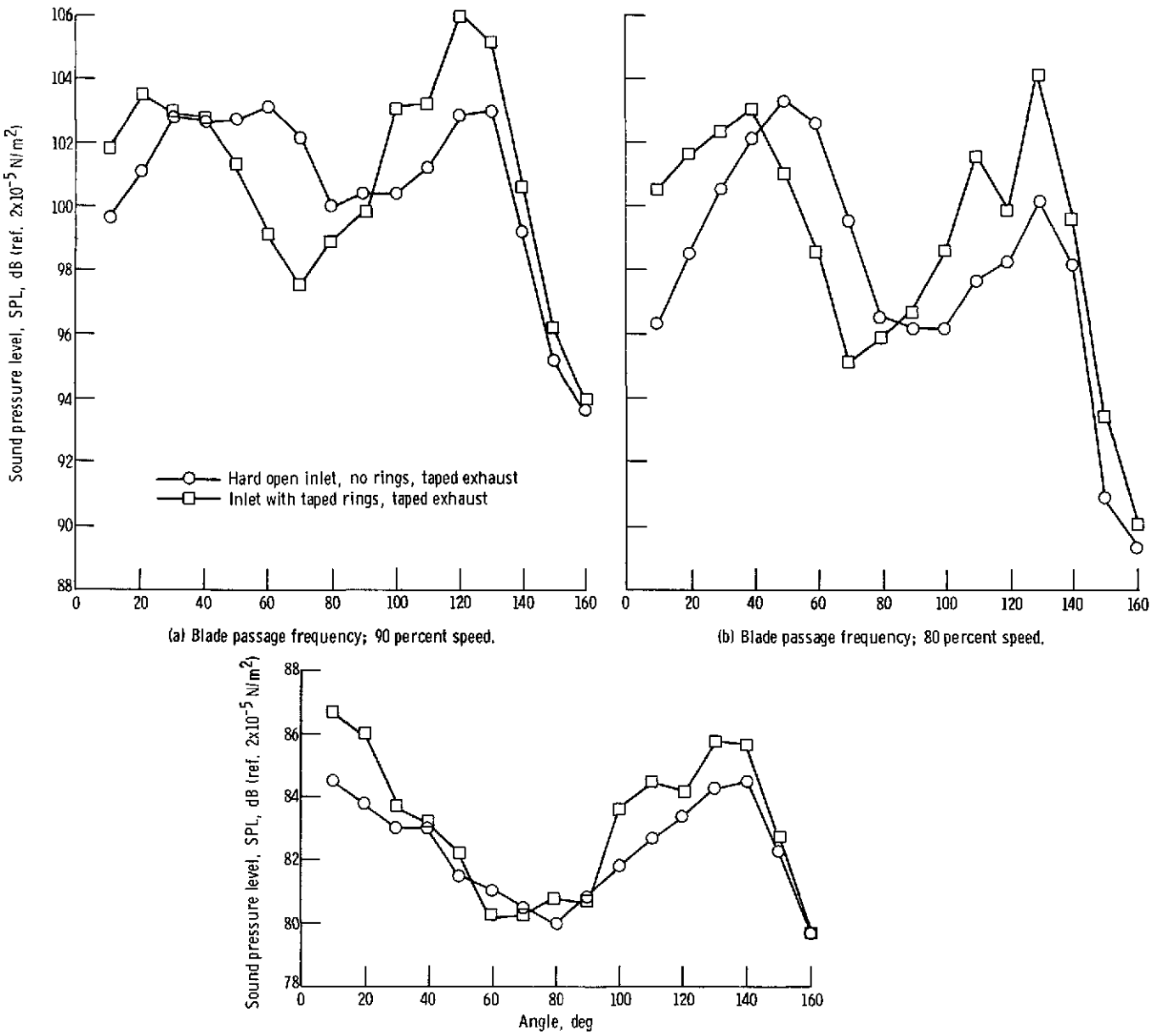
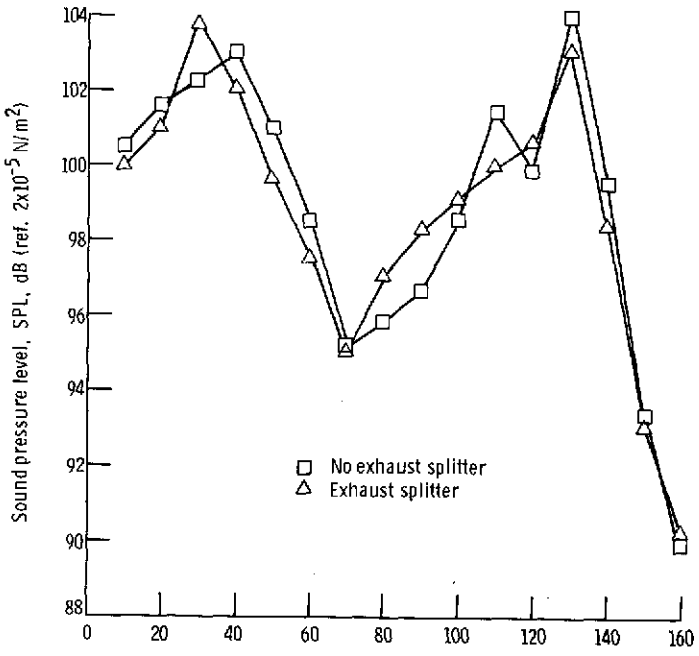
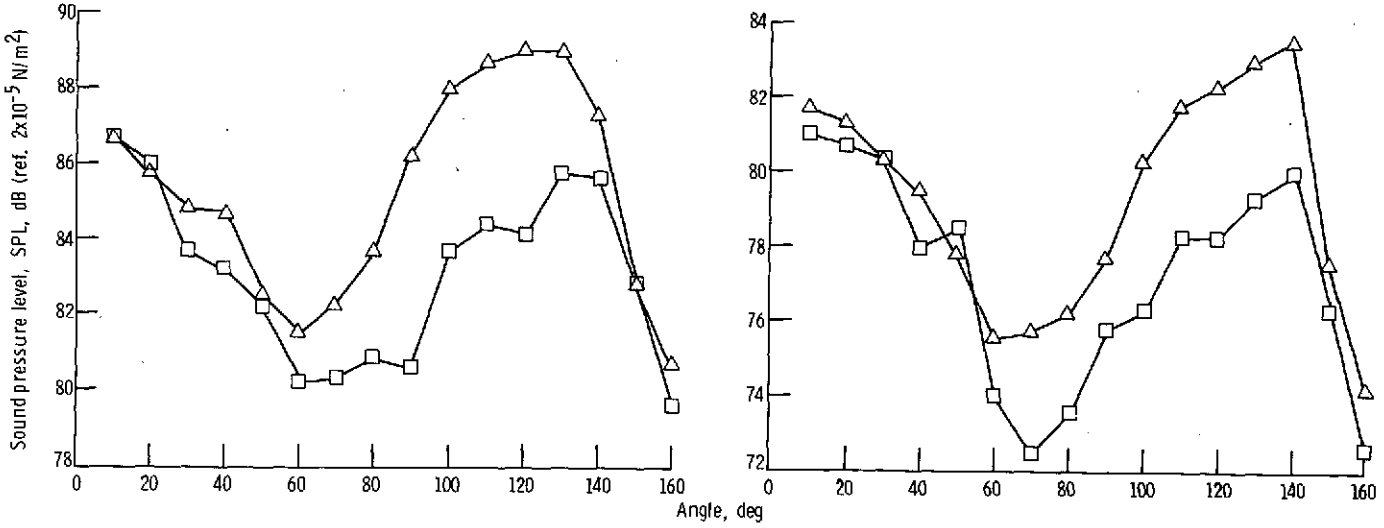


Figure 16. - Effect of taped inlet rings on directivity of noise. One-third octave band data; no exhaust splitter; radius, 30.5 meters (100 ft).



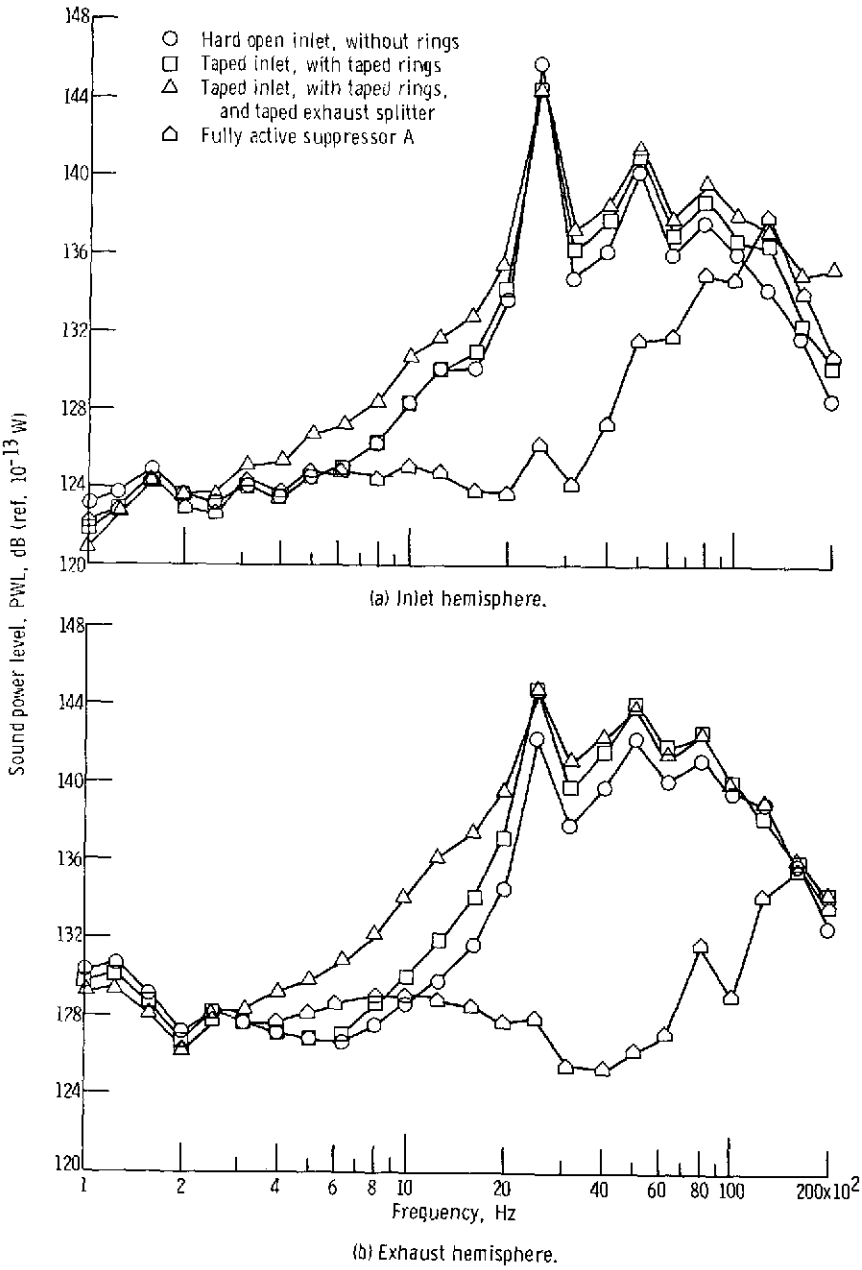
(a) Blade passage frequency; 80 percent speed.



(b) Frequency, 800 hertz; 80 percent speed.

(c) Frequency, 800 hertz; 60 percent speed.

Figure 17. - Effect of taped exhaust splitter on noise. Taped inlet with taped rings; taped exhaust; one-third octave band data; radius, 30.5 meters (100 ft).



(a) Inlet hemisphere.

(b) Exhaust hemisphere.

Figure 18. - Effect of splitter rings on sound power level spectra at 80 percent speed.

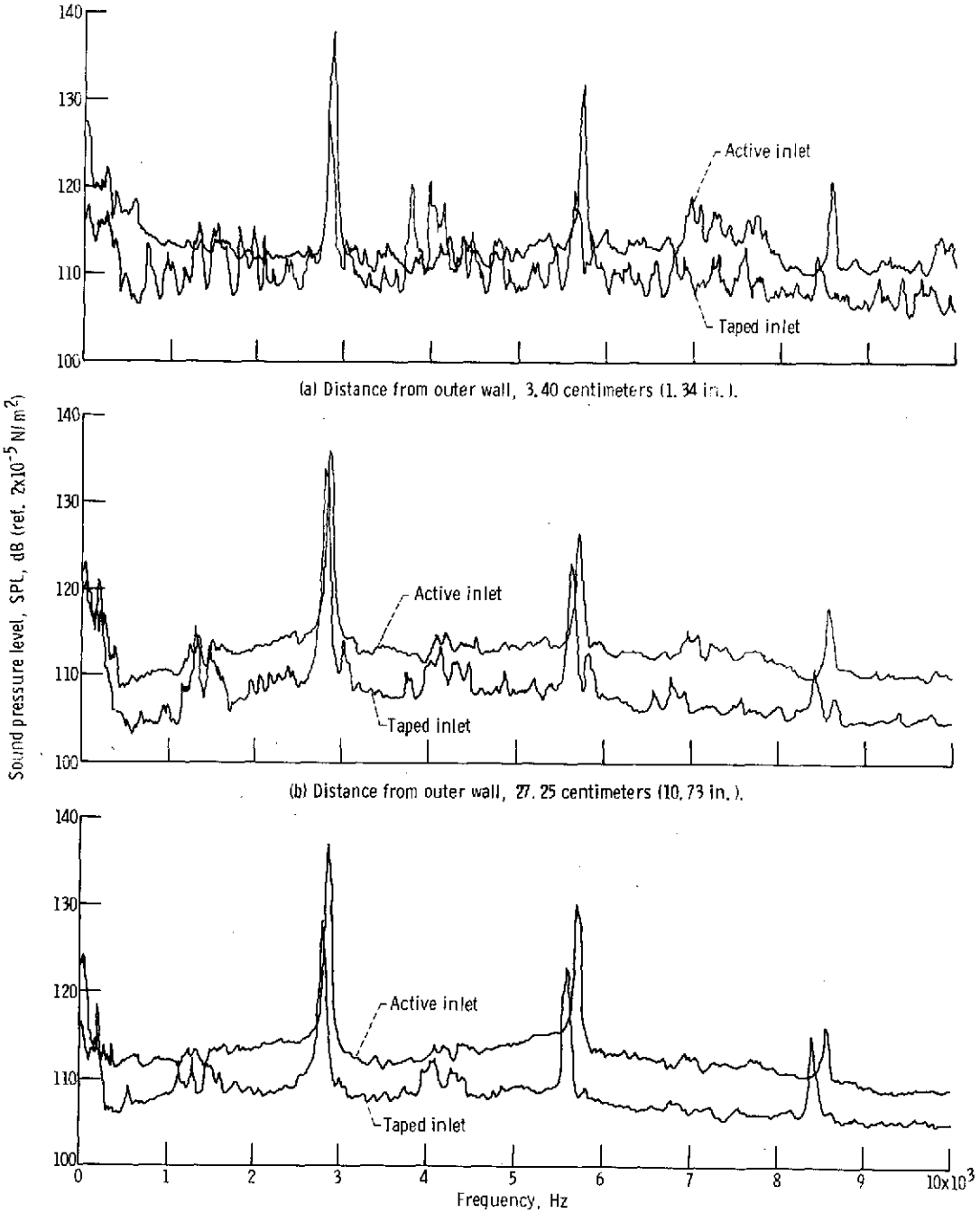


Figure 19. - Narrow-band spectra from radial acoustic probe. Suppressor B; 90 percent speed.

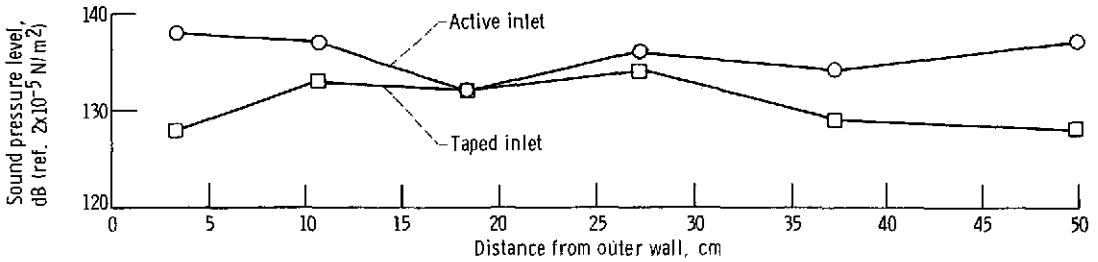


Figure 20. - Radial variation of blade passage tone at 90 percent speed; narrow band data.

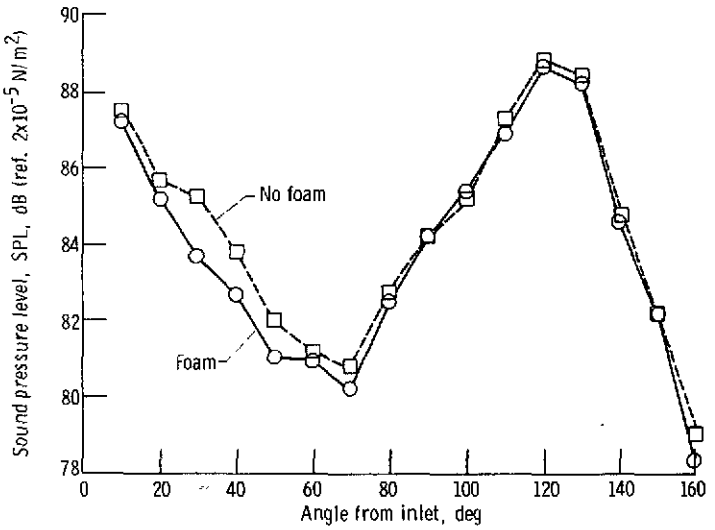


Figure 21. - Effect of foam on outside of fan cowl on noise at 90 percent speed. Frequency, 2500 hertz; radius, 30.5 meters (100 ft); one-third octave band data for suppressor A.

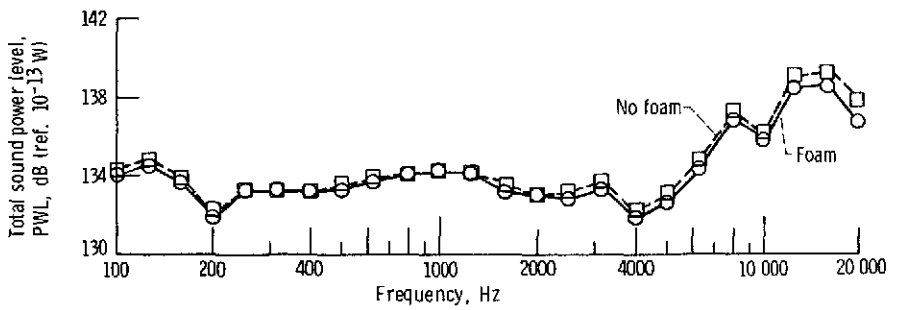


Figure 22. - Effect of foam cowl treatment on total power spectra at 90 percent speed for suppressor A.